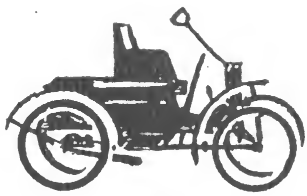
MOTOR MEMORIES

EUGENE W. LEWIS



MOTOR MEMORIES

THE AUTHOR

Eugene W. Lewis, President of the Industrial National Bank of Detroit, was connected with the Timken Roller Bearing Company for many years. First as salesmanager; later an executive. While a young man, he watched the early struggles of the infant Automobile Industry and later saw it emerge the greatest force the world has known. With samples of the now famous but then little accepted Timken tapered roller bearings wrapped in a flannel cloth in his hip pocket, the young salesman traveled over the country, seeking out the early automobile makers, wherever they might be. He got to know them—the lowly and the great—and most of them became his friends. In this book, he remembers them.

MOTOR MEMORIES

A SAGA OF WHIRLING GEARS

by

EUGENE W. LEWIS

1947

ALVED, PUBLISHERS
DETROIT

Alved, Publishers

Buhl Building

Detroit, Mich.

FIRST EDITION

Printed in the United States of America

To my good friend

and former business associate

COLONEL HERBERT W. ALDEN

Detroit, Michigan

[*The automobile, the airplane, the radio and the motion picture, all creations of the last thirty or forty years, have revolutionized our American scene and way of life; yet Detroit—the home of the automobile—has done nothing to preserve the records of this monumental achievement and, unless timely measures are taken to secure them from oblivion, the knowledge of the development of the automobile and its inventions will perish with the pioneers, in whose memories, alone, it today exists . . .*

A statement in 1934 by CHASE S. OSBORN, former Michigan governor and the state's Grand Old Man.]

ACKNOWLEDGMENTS

As its title conveys, this is a book of memories, and yet, spanning more than half a century, a man's memory must be much sharper than mine, alone, to bring into kaleidoscopic relief all the events of those stirring and adventurous years. So I have friends to thank for reminding me of happenings long ago buried in the haze of years. My memory has been refreshed by facts and figures furnished by the general office of the Automobile Manufacturers' Association and I am indebted to W. L. Powlison, its able and genial Librarian, and to O. P. Pearson, Manager of the Statistical Department; to Chilton & Company, publishers of *Automotive Buyers Guide;* Julian Chase, Directing Editor of *Automotive and Aviation Industries,* and the National Standard Parts Association. I referred to *The Automotive Industry* by E. D. Kennedy (Reynal & Hitchcock); and *Then Came Ford* by Charles Merz; *The Turning Wheel* by Arthur Pound, both published by Doubleday, Doran & Company; *Men, Money and Motors* by Theodore MacManus and Norman Beasley (Harper & Brothers), and *Who, Me?,* by my good friend, Chris Sinsabaugh (Arnold Powers, Inc., Detroit). I wish to thank George M. Slocum, publisher of *Automotive News;* Neal G. Adair, Managing Editor of *Motor, The Automotive Business Magazine;* Frank Rising, General Manager of Automotive and Aviation Parts Manufacturers, Inc.; A. H. Eichholz, General Manager of the Motor and Equipment Manufacturers Association—and many others.

It is with deep gratitude and pleasure that I acknowledge the generous urging and inspiration of my friends and the assistance so many have given me in the compilation of this work.

ALVED of DETROIT PRESENTS

A Book by EUGENE W. LEWIS

MOTOR MEMORIES had to be written and published, if for no other reason than stored among the author's recollections were hundreds of incidents of great importance to the massive, yet woefully incomplete record of events concerning the cradle days of the automobile in America. A long and successful lifetime has gone into the making of this book, and over four years were spent in its writing by one who has lived through the more than fifty-year span of motor car development in this country. The men of whom he writes, he knew. His facts and figures, at his request, have been checked against statistical records.

Illustrating MOTOR MEMORIES presented a problem. We wanted something new, but not novel, so we secured the cooperation of Floyd S. Nixon, who during his thirty-five years with the Detroit *Free Press* has at one time or another sketched from life the old-time automobile men whose pictures appear. Sketches submitted by Mr. Nixon to the author resulted in the drawing from memory the faces of these men. The completed drawings were compared with contemporary photographs. Few corrections were necessary, but when needed they were made.

Some readers will ask why Mr. Nixon depicts some men as in their later years and pulls others from out of the past, still young. They are pictured as Mr. Nixon remembers them. Just recently, Mr. Charles B. King has been in and out of Detroit rather often. He is therefore remembered as the artist has just seen him rather than as Charlie King of the early days. Mr. Henry Ford is pictured at the time of World War I, during which period his success reached full bloom. And so on with the other principals. They are drawn as best remembered.

We present, as a result, Eugene W. Lewis' narrative of events and asides in the lives and achievements of many automotive pioneers, highlighted by the artist Nixon's recollection of the same men in portrait form.

THE PUBLISHER.

AUTHOR'S NOTE

Nudging memories all too frequently bring into being autobiographies from men whose lives have been too drab or routine to warrant detailed recording. If such were always fact, the not writing their life stories would be a humane and kindly service. Nothing bores one so much as long-winded men who tell in books of their sorrows, their elations, their adventures at living.

This book has no such purpose. It is not an autobiography. It is not about Me. It is the story of automobiles, their component parts, and of the men who made them. My friends have been urging me to do this book for a long time, urging me to tell the story of the automobile and its makers as I found it in the various parts of the United States during the early days and as I have seen it subsequently unfold. They say, and so does my publisher, that such an experience in the early days of the automobile carries an obligation to him who in the future may gather up this book along with a hundred others and ten thousand magazines and newspapers and say seriously, "Now, we will try to tell the full story of automobiles and automobile men. We will 'try'." I shall be pleased if these memories contribute anything at all to that gargantuan, almost futile effort at writing a history of this fabulous industry.

Bits of the story, great patches of the fabric are buried with men long since gone, who, had they ever thought of writing about their experiences in the making of automobiles during the industry's infancy, were not sufficiently articulate to do so. Few, if any, of those men had ever heard the phrase "public relations," and not one, to my knowledge, ever employed a press agent to sound the tocsin and beat the tom toms to acquaint the public with the various facets of his personality. Anyway, the public was not so much interested in the men, but it was interested in the automobile. During its cradle days the newspapers treated the automobile as a sports

facility, failing to recognize that here was an industry that was to change and shape the course of the entire world.

Legend has become the automobile's Old Man of the Sea, and legend, of course, is sweeping enough to include some facts and many fancies. Fancies, some feel, make the best reading, and in a fictional Paul Bunyan or John Henry of the automobile world that might be so; but I believe that in the automobile industry there has been so much romance, so much elemental, fundamental and primitive emotion on the part of so many men possessed of originality, initiative and idealism, most of them gentlemen, there is no need to go beyond truth to tell an entertaining story, and that is why I am sticking to incidents as I remember them.

I wish some of those old timers were here now to take up places in this modern world. Were some of them with us they might do something to overcome much of the scepticism so prevalent today. Now, perhaps my memory has dimmed, but I recall few sceptics in the beginning of the automobile era. The men who made the first cars did not know the word or the meaning of the word "impossible." It may be they were so poorly informed regarding limitations of Man they couldn't recognize their own. Anyhow, those fellows got things done. The first makers of automobiles had a sense of self-sufficiency and a lot of vision. These are splendid traits when coupled with enthusiasm and the will to do something the first time.

It is my hope that in some humble way this book, which is admittedly incomplete, may add something to the great story of the automobile and its progenitors. As I glance over its pages I feel a golden glow of satisfaction in the knowledge that the voice of tires on good paved roads and the song of the wind as we pass it by are merged with a motor's hum complete into a symphony which brings joy and health and hope to all mankind.

Eugene W. Lewis

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CHAPTER 1

I Watch the World's Greatest Show from the Ringside

In August 1946, I watched the 1946 Glidden Tour pass by while thousands lined the sidewalks of Woodward Avenue in Detroit. The participants were principally ancient automobiles, some of them bright with new paint, some of them chipper and spry, others halt, shivery, and crawling—all of them hoary with age and, like many old things and people, queer to the point of eccentricity. Many of these old cars had been exhibited during the Golden Jubilee held here earlier in the same year.

It was the end—and a sort of grand climax—to 1946's Glidden Tour, the first held since 1913. Neither the tour nor the parade actually meant much in 1946. The fact that these ancient vehicles covered a hundred miles in a certain number of hours proved nothing, except perhaps the fact that cars in the old days would not have appeared so terribly bad had they been given the modern roads we now have; and certainly the "tour" added no new knowledge to the science and business of making automobiles. The last Glidden Tour gave a little sport to a few men who have made a hobby of collecting old automobiles, and it afforded much entertainment and amusement to people in the towns and along the roads as these antiques "roared" through, and to the crowds on Woodward Avenue watching the queer parade.

Good, clean sport and hilarious entertainment. But among the tens of thousands who watched these graybeards of the automobile world crawl past in the excus-

able vanity of great age and achievement, there must have been many thoughtful ones—even as I—who remembered that the first fitful explosions of the first internal combustion engines (daddies of these, or cousins, perhaps) were the percussion instruments of the greatest symphony this earth has ever known—the symphony of machines—a rhapsody in blue steel and iron and tin—the music of metals. Because, figuratively at least, the village smithy was king until those first explosions of the first combustion engines ushered in the Great Industrial Age. Europe and America had entered an industrial era long before. The beginning of that industrial era sounded the death tocsin for a feudal system long archaic and waiting to be swept into the scrap heap of human tyrannies and miseries which had stood in the way of progress. But the Industrial World before the automobile came was strictly limited to a few noisy plants in a few noisy cities of the world and a scattering of "smithies" in its towns and villages. The world—humanity itself—reaped from industry no great, unlimited harvest before the automobile. *That* industrial era was slow, crawly, its work and its profits, its miseries and its pleasures, felt by only a few million of this world's billions.

A MONUMENT TO FREE ENTERPRISE

The coming of the automobile ushered in the Great Industrial Age that has reached out and touched every nook and corner of this world, benefited, to some extent or degree, in one way or another, every man, woman and child on this planet.

Now, this is an extreme statement, but I shall make it and then stand back to take on all comers: except for religion, of course, the automobile has brought more happiness and well being, more help and aid and comfort —and profit—to common people than any thing or happening since Magna Charta.

Who, then, is responsible for this vast accomplishment? Who invented the automobile and brought this boon to mankind? Was it Leonardo da Vinci? Followers of that great man claim everything else for him, including the invention of the submarine and a sure cure for rheumatism, and some of them do hint vaguely that he built some sort of a self-propelled machine. They do not explain whether or not it ran.

Was it Nicholas Joseph Cougnot, a Frenchman, who built a steam-driven tractor in Paris about 1770 and wrecked it while driving at the breakneck speed of three miles an hour?

Was it Ford? Duryea? Olds? Haynes? Winton? Who?

The truth is that no one man invented the automobile. No group of men met, had a meeting of minds and said, "Let's build an automobile." And so there is no statue in any of the beautiful parks of the great automobile city of Detroit honoring the man who made it great and famous, no marble monuments in any of our great *national* parks so that a grateful nation might pass by, bow reverently, and say, in effect, "Thank you kindly, sir, for bringing us all health and wealth and happiness."

But there should be a monument. It should be faceless and nameless. The inscription should read something like this:

> THIS STONE HONORS AMERICAN INGENUITY AND SKILL, INITIATIVE AND INVENTIVENESS, ENERGY, RESOURCEFULNESS AND A FREE SYSTEM OF ENTERPRISE WHICH HAS MADE THIS THE GREATEST, HAPPIEST COUNTRY THE WORLD HAS EVER KNOWN.

And there you have it. *What,* not *who,* made the automobile possible. Ingenuity, skill, and initiative, inventiveness, energy, resourcefulness—and men with a

little capital and guts enough to back what they believed in, under a free enterprise system which at least gave them a run, a fair gamble, for the return of their money with a profit.

There were many idealists among that group of early pioneers in the automobile picture. I met them all, became friends with many of them, and yet I cannot recall any one of them taking a heroic stance and saying, "I shall build an automobile. I shall build it for the benefit and happiness of the world." Subconsciously their actions were idealistic. There was evident idealism, but chiefly group idealism which came later. There was a certain driving energy and, of necessity, a nosey inquisitiveness among those early pioneers, and I haven't the slightest doubt that automobiles—*good* automobiles—would have been made without the incentive of profit—a few of them. But in the main the men who made the first ones, who put the whole world on wheels, made them with the profit motive uppermost in mind. Capital—profit—presently so freely maligned in certain pinkish circles, was considerably honored in those far-off days.

Just here I must explain that I was interested in and connected with the pioneering Timken Roller Bearing Company. My job was to find these automobile pioneers—individuals and companies—wherever located in the United States, and, of course, to interest them in Timken bearings. None of the early experimenters had facilities for making proper axle construction, so it was necessary for the Timken Roller Bearing Company to go into the business of manufacturing axles. Later—in 1908—The Timken Detroit Axle Company was organized in Detroit. Its operations and affairs are now successfully conducted by the Rockwell brothers—Willard and Walter.

Looking back over the span of long, rich years since 1900, one sees that the old America that our fathers and grandfathers and the older generation knew has gone.

Transportation has multiplied ten thousand times in number; and the motor car is probably more responsible than any other of our modern inventions for a complete change in the social behavior and habits of our people. The low-priced car is a symbol of economic democracy.

Courageous pioneers who had vision and were the first to recognize that the growth and development of the industry rested upon supplying small, reasonably priced cars to the masses, and that the expansion of the industry could not be accomplished by selling a few high-priced luxury cars to the classes, are the men and concerns who have successfully weathered the various economic changes of the past forty years.

The motor car appealed to the public imagination from the start. It has dramatized its progress all the way to its field of everyday utility, and, as a utility, it retains its dramatic interest. The provincial has gone.

The automobile appealed to my imagination, along with others. I, however, was luckier than most. I had a grandstand seat to watch The Greatest Show on Earth. Some wag once said that I straddled an axle and rode it from one city and town to another to meet these pioneers of the automobile business and interest them in Timken roller bearings. However—the Timken axles and bearings did comprise a Magic Carpet of a sort.

Anyway, I saw the show . . .

CHAPTER 2

The New "Gold Rush" Attracts Daring Young Men

In the beginning . . . well, there had to be a beginning. Historians in the automobile industry seem to vie with each other in attempting to see just how far back into the remote past they can go to find that beginning. One writer goes back into the history of the Old Testament to Ezekiel, where the prophet wrote of his vision in which he saw the spirit of the living creature hidden somewhere in four wheels. Whether this "spirit" was steam or gas or electricity or atomic power, Ezekiel didn't seem to know.

Another writer, a steam man, is more moderate. He merely states, without equivocation—and, incidentally, without revealing his authority—that steam was employed to produce mechanical motion about 130 B.C. Perhaps he knows his facts and his history. Certain it is that steam was a sleeping giant for many centuries after it was first discovered until it was put into practical use during the Seventeenth Century.

For the purposes of this book it is not necessary to go back into antiquity. Except for a few students and scholars, nobody cares. It is quite plain and logical that nearly all the earliest efforts in the automotive industry originated with steam as the motive power. The records show that Otto, with his 4-cycle, internal combustion engine, was about the first to command major attention. That was in 1876—and that is as far back into the remote past as this writer will endeavor to probe. The Benz "jump spark" was applied

about 1887. Europe, prior to 1900, actually produced and had on the road various types of cars, and these gave fairly good results.

The art or science of making some of the other parts of a motor car—springs, fans, friction bearings, shaping of steel and such—had already been explored and well developed. The gear shifts transmission, however, did not appear until about 1897, when a French car, made by the Renault Brothers, came on the market.

Pioneers had been experimenting in this country, chiefly with steam as motor power, trying to produce a horseless vehicle, since 1890. Nearly all of the men whose names are associated with the early development of the motor car tested this system. In 1893 Henry Ford succeeded in inducing his first steam-powered contraption to propel itself. This is not generally known and is disputed by some, and it may as well be admitted Mr. Ford's first car was no howling success.

Steam engines are still being manufactured and under certain conditions and with their special characteristics—strong pulling power at low speed, capacity for overloads, and ease in driving on the road—are ideal. The steam omnibuses used in London are an example.

THE ROMANCE IN BIG BUSINESS

Some fabulous stories and rumors about steam cars have, through the years, gone the rounds and been believed by the gullible. There is the old, old one, of course, about the giant octopus reaching out to strangle young industry. This one has been told about the DuPont's holding back plastics (the world is flooded with plastic products today). And about the radio and electric combines conniving with the entertainment and motion picture world to hold back television (before this book can be published, *WWJ* and The Detroit *News* will have established television as a service in Detroit).

The simple truth is that steam in road cars served its purpose, which was primarily to excite the imagination of inventive men and lead them to gasoline cars. Steam cars reached their peak and fell by the wayside for the same reason that hundreds and hundreds of makes of gasoline cars did.

Those who say that figures are cold and without feeling probably have never talked to an enthusiastic astronomer and heard him grow emotional about light years and the world of the infinite; or never read one of the great Einstein's little lectures to Princeton fledgelings in which the famous mathematician talks glibly and glowingly of curving space and time. And certainly anyone who says there is no romance in business just does not know about the motor car. There has been romance in gold, romance in oil, romance in diamonds—and romance in automobiles. I believe the motor industry is, up to the present time, the outstanding example of romance in business.

No event short of a gold rush ever attracted so many people in so short a time into new industrial endeavor as did the making of motor cars. Companies sprang up overnight. Never was a new industry more enthusiastically and persistently hustled to its destiny. In this instance, destiny has proven that its job was to put practically all America (and the world, for that matter), and its products, on wheels of rubber and bring into being thousands of new industries of supply, thousands of miles of hard-surface roadways, a new scale of wages to millions of workers, and a new and high standard of living for people everywhere. I doubt if the most enchanted and enthusiastic visionary of that early time ever dreamed of the vast possibilities of the Horseless Age.

The makers of motor cars had no precedent to follow; they were entirely on their own. Neither were there any

hindrances, such as engineering rules, as handicaps. Sheer enthusiasm, imagination and ambition were required and supplied aplenty. Capital of the speculative kind (always found quickly in Detroit where the "it can't be done" theory has difficulty in surviving) was readily attracted to the business. Many concerns were fly-by-night. Some went along for ten or twenty years. Most of them died early, and a few carried through to the present day. It was a lusty, healthy business—with a high mortality rate and the record of the industry will stand until something new, big and startling enough to excite the imaginations of ambitious and enterprising men, comes along. New enterprises are bound to come when this jittery old world, following the conclusion of the war, has shaken itself down. Perhaps atomic energy will do the trick. Any new business will have to "travel," however, to encompass in a similar short space of years, the magnificent strides—technologically, in metallurgy, and engineering—and, if you please, merchandizing and salesmanship—accomplished by the motor industry.

Detroit was, to all intents and purposes, a small town when the industry began to grow. It was short on everything needed by an industry with growing pains except money, enterprise, and guts. It had, however, no large social clubs for business men exclusively. The nearest approach to a popular club was the Hotel Ponchartrain Bar. This "club" has been much praised, also maligned and ridiculed. Automobile business men met there to transact business and exchange ideas, much as they do today in the more formal atmosphere of their favorite clubs. If modern recording devices had been available then, they could tell of the formation of dozens of companies right there with capital running into hundreds of millions of dollars, and of ideas exchanged which were to form the basis of the modern automobile business.

Much has been written about the Ponchartrain Bar, not all of it true. The Ponchartrain was a business men's club and was the setting in which was patterned the future of the automobile, of Detroit and of the world. Prospective motor car builders came from all walks of life and professions. So did prospective stockholders, many of whom wanted to get rich quick. Some had previous experience as manufacturers in other lines, but they knew nothing about the new science of producing motor cars. Nobody knew much about that. Engineers, some graduates of scientific schools, but mainly a species Charles F. Kettering calls "monkey wrench engineers," had much to learn—practically everything to learn. They learned fast. They learned a lot in the Ponchartrain Bar. William J. Chittenden, affectionately known as Bill to all of the would-be motor car manufacturers who frequented his "club" could, really, be considered a "pioneer" in the industry. Bill was probably exposed to more promotional "hot air" than any other citizen of Detroit.

At one time there were something like eleven hundred companies, large and small, whose heads *believed* they were manufacturers of motor cars. These included concerns which did not use advertising to any extent and made probably six to twenty-five cars before dying naturally from competition or inefficiency. Many manufacturers of that earliest period were convinced that they should offer wide range of models. They had not learned that concentration on and simplification of production are keys to success.

MANY CALLED, FEW CHOSEN

Many Detroiters recall Alfred O. Dunk who had a large place on Third Street filled with car parts from defunct companies. He possessed, at one time, parts from more than 2200 models. In the early stages of what I would call the second phase of the young industry, there were approximately 850 listed manufacturers of motor

cars, all with advertised models. The list gradually dwindled until in the 1930's there were only about twenty-five companies advertising cars for the market. At the beginning of World War II, twelve companies were making all passenger cars in the United States.

A sturdy list of pioneers came up in those young days. Most of the present generation have never heard of some of them, and some of the older ones have probably forgotten many of them. But put it down fast and straight that these old timers were a lusty, gusty bunch of competition-loving men whose clever hands and keen brains shaped destiny—if ever so clumsily.

The bicycle played an important part in the early development of the automobile industry. It did three specific things:

It furnished high-grade mechanics and engineers—mechanics such as the Dodge Brothers, Knudsen, and many others who became practical engineers.

It gave the city dweller a taste for the open road. He saw over the horizon literally for the first time. Very few city or even village dwellers could afford a horse and buggy. These luxuries cost money to buy and operate and were kept pretty close to the professions—medicine and the law. A bicycle was cheap and took little financial upkeep. Almost anybody could own one—and a great many did. In the decade beginning about 1890, the bicycle craze struck with full force and effect every village and city in every state. Bicycle clubs were organized everywhere with most of the members uniformed and regular runs and races scheduled. This craze and its resultant competition brought on a typically American disease—boasting—which carried over to the reign of "Tin Lizzy" when the merits of deathless rattletraps were dinned by their owners into the ears of all who would listen. Even today owners brag about the long life of their pre-war cars.

Then, too, the bicycle, through these touring bicycle groups, required and got sign postings placed in sequence over carefully measured routes, placing the old hit-and-miss guesses that similar sign boards formerly carried. These sign posts were the forerunners, the beginning, perhaps the stirring incentive for good roads. Bicycle groups made vociferous demands for better roads, and were responsible for the first production of carefully scaled road maps.

The peak demand for bicycles was soon reached, the demand receding more and more until the bicycle found its place as a business and utility vehicle—and a pleasure craft for youngsters.

SOME CAME EARLY, STAYED LATE

The bicycle craze to a certain extent was a handicap to the motor car industry, for the memory of the bicycle craze—its fast rise and quick recession—produced a definite resistance in securing capital to form early motor car companies. The earliest prospective investor in motors was a sceptic (this as against the early manufacturer who was always a super optimist) and was sure to say, "This new thing is going to be just another bicycle craze and will soon die out. Anyway, motor cars can never be used for business. They are a luxury intended only for the rich."

That was the dominant feeling of investors up to about 1900 and indeed was frequently heard for a few years longer. However, in a short time there were no "passive" buyers of motor car stocks. They were all clamorously active to be enrolled as stockholders in the numerous companies that began to mushroom.

The automobile endured the same experience as the bicycle. There were more bicycles manufactured annually up to World War II than were ever built in any one year in the hey-day of their existence as a luxury.

Bicycle fans had seen the beauties beyond the horizon, tasted the freedom of the country and felt the lure of the open road. Consequently, it was easy for them to visualize the pleasure to be derived from taking the entire family out in a motor car for a Sunday picnic.

But no one, except, perhaps, a visionary one or two or three, could possibly have forecast the motor industry to become the compelling giant it is today, fashioning the destinies and lives of all men.

Numerous experimenters attempted to build cars during the years 1893 to 1902, inclusive. Anywhere from 75 to 100 steam, electric and gasoline cars were constructed and road-tested during that period. The first issue of *Horseless Age,* printed in 1895, stated there were 73 known experimenters working on steam, electric or gasoline automobiles. Prominent among those early pioneers who subsequently became identified with volume production were:

Elwood Haynes . . . . *Haynes*
Charles and Frank Duryea . . . . *Duryea, Stevens-Duryea*
Alexander Winton . . . . *Winton*
Charles B. King . . . . *Northern, King*
R. E. Olds . . . . *Olds, Reo*
Henry Ford . . . . *Ford, Mercury, Lincoln*
Al Riker . . . . *Locomobile*
Edgar and Elmer Apperson . . . . *Haynes-Apperson, Apperson*
Harry Knox . . . . *Knox, Atlas*
Lewis Clark . . . . *Autocar*
Howard E. Coffin, Roy D. Chapin . . . . *Olds, Thomas-Detroit, Hudson*
H. H. Franklin . . . . *Franklin*
J. W. and William Packard . . . . *Packard*
Geo. N. Pope, Percy Maxim . . . . *Pope-Hartford, Toledo, Tribune*

Thomas B. Jeffrey	*Rambler*
Henry M. Leland	*Cadillac-Lincoln*
Eckhart Brothers	*Auburn*
Mathews and Lewis	*Jackson*
F. B. Stearns	*Stearns*
J. Bartholomew	*Glide*
Pierce–Col. Chas. Clifton	*Pierce-Arrow*
Lou Kittredge	*Peerless*
White Brothers	*White*
Studebaker Brothers	*Studebaker*
David Buick	*Buick*
Marmon Brothers	*Marmon*

This group of men took their experimental cars from their early phases into the production of car models by trade name, as above listed. The old question of who made the first automobile is still controversial. I have stated earlier, the automobile, as such, whether steam, electric, or gasoline was not invented by any one man, at any one place, at any one time.

Among the early experimenters who subsequently became identified with commercial production of motor cars, it is definitely known that in the years of 1893, 1894, 1895, there were ten individuals who were later to appear as producers: Elwood Haynes, Charles and Frank Duryea, Alexander Winton, Charles B. King, R. E. Olds, Henry Ford, Al Riker, and Elmer and Edgar Apperson. There may be others; I fail to recollect.

LET'S TAKE A LOOK AT THEM

The Duryea car early was made in quantity in Reading, Pennsylvania. Later the Stevens-Duryea, a high-priced car, was manufactured by the Stevens Arms Company at Chicopee Falls, Massachusetts. Elwood Haynes was superintendent of an oil and gasoline company in Kokomo, Indiana. His trips over the oil fields and territory were made mainly by horse and buggy. Always in

his mind was the idea, which became almost an obsession, of a mechanical vehicle which could go faster and more comfortably. Haynes was a graduate of Johns Hopkins University and Worcester Polytechnic Institute and as a qualified metallurgist he went to the Apperson Brothers in Kokomo with his ideas and plans as he developed them. The Appersons were fine mechanics. They started to build an automobile in 1893. This was according to the Haynes' plans. The work was to be done on an hourly basis. Manufacturers were yet to learn that the making of automobiles was not part time work.

However, the horseless vehicle attempts of Haynes, King, and others received great impetus at the Columbian World's Fair in Chicago in 1893. The exhibits were intriguing and these men, in particular, were much taken by a gas engine made by Sintz Company of Grand Rapids. It was a two-cylinder, two-cycle engine. King and Haynes immediately ordered engines that year. Haynes and Apperson entered a car in the Chicago *Times-Herald* Road Race in 1895. The car was equipped with a two-cylinder motor designed by Edgar Apperson.

Mechanical improvements were rapidly beginning to appear and the Haynes-Apperson Company flourished. The combination dissolved later, Haynes bringing out the Haynes car and the Apperson brothers continuing with a car bearing their own name. They called it the Apperson Jackrabbit. Both were excellent cars in the later years of their development. Both companies expired in the early 1920's.

Experimenting with steam as a motor power in the early days was R. E. Olds. Al Riker also contrived a steam contraption in 1891. It was later called the Locomobile. Riker was one of the exhibitors in the first automobile show at Madison Square Garden. As before stated, Henry Ford's first attempt at making an automobile was a steam car.

RANSOME E. OLDS

ELWOOD G. HAYNES

EDGAR APPERSON

CHARLES E. DURYEA

"AMERICAN INGENUITY AND SKILL . . ."

These early experimenters became important producers.

ALEXANDER WINTON

CHARLES CLIFTON

LEWIS S. CLARKE

HERBERT H. FRANKLIN

. . . INITIATIVE AND INVENTIVENESS . . .

They were among first to make cars in volume.

Alexander Winton landed in New York from Scotland at the age of 19. He was one of the early bicycle riders and builders, as well as a pioneer in the automobile business. He had considerable experience with a marine engine in New York City. Later he shipped on vessels to study the operation of steam power. He started work on his horseless carriage in 1893. It is stated that the first motor car sold in this country was a single-cylinder phaeton built by Winton. The car was delivered April 29, 1898, to Robert Allison, whose home was in Pennsylvania. Winton gained a reputation as a race driver. He built and piloted an automobile in the Gordon-Bennett races in France and later established track records in this country. One of his major achievements was the formation of the Winton Gas Engine and Manufacturing Company in 1912. It developed gasoline engines for the general market and subsequently a diesel engine at the Winton Engine Works in Cleveland. That company was sold to the General Motors Corporation in 1930.

SOME "DOUBLED" IN TRUCKS

The Knox automobile followed the earliest pioneers. The manufacture of this car began in 1896. The company was an early producer of the phaeton type. Later it made the orthodox style body and followed this through the years of its existence. Harry Knox left the Knox Automobile Company and produced trucks under the name of the Atlas Motor Truck Company.

Lewis Clark and his brother, from Pittsburgh, in 1897 were building an automobile, at Ardmore, Pennsylvania. It became the Autocar. They were among the first to specialize in building motor trucks. The name "Autocar," established at the century's turn, remains well-known today.

A year or two before or after the turn of the century

new cars, which were to become standard, were rapidly developed. Howard E. Coffin, whose activities are chronicled later in these pages, made his first steam car at Ann Arbor. In 1898 H. H. Franklin produced his Franklin air-cooled car at Syracuse. In 1899 the Packard Company was formed. George N. Pope and his associates with the Electric Vehicle Company, were producing a line of electric cars and later gasoline cars—the Pope-Hartford, Toledo, and Tribune. In 1900 Thomas B. Jeffrey produced his Rambler at Kenosha. Henry Ford, in Detroit, brought out his Ford; Eckhart Brothers manufactured the Auburn; Mathews and Lewis the Jackson; F. B. Stearns, at Cleveland, the Stearns. J. Bartholomew, whose first experiments were with steam, later built the Glide, another gasoline-driven car, in Peoria, Illinois. The Pierce-Arrow was produced in Buffalo; the Peerless and the White in Cleveland, the Studebaker in South Bend, the Buick in Flint, and the Marmon Brothers made the Marmon in Indianapolis. All this in 1902. That ended the first decade of activity for some of those pioneers who later were to be chief suppliers of the world with automobiles. During this decade numerous individuals and partnerships attempted to build motor cars. None of them, however, became advertised volume producers and most of them quit after making one or a few cars.

CHAPTER 3

Steam and Electric Cars Had a Short Vogue

At the first automobile show at Madison Square Garden in November, 1890, 34 makes of cars were exhibited. Nineteen of these were gasoline, seven were steam, six were electric. Two were a combination of gasoline and electric. In the electric car group, the following companies were represented:

Pope-Waverly, Baker Motor Vehicle Company, Buffalo Carriage Company, Electric Vehicle Company, Woods Motor Vehicle Company and National Automobile and Electric Company.

Other early electrics which followed were:

Studebaker, Rauch and Lang, American Electric, Babcock, Detroit Electric, Ohio, Century and others.

Through the ten years following 1899, there were at least twenty-five well advertised electric cars. During about the same period, there were fifteen to twenty steam cars on the market. At the first automobile show in 1900, steam cars from the following companies were shown:

Foster Automobile Company, Locomobile Company of America, Stanley Manufacturing Company, Mobile Company of America, New York Motor Vehicle Company, Overman Automobile Company and Steam Vehicle Company.

Prominent among steam and electric cars which stayed on the market for several years were:

White, Stanley, Stearns, American Electric, Doble, Ross, Steamobile, Century and a few others.

Some of these steam cars acquired considerable vogue with fair sales volumes recorded, up to about 1915. Several manufacturers of steam cars later became successful builders of gasoline-propelled vehicles.

Beginning about 1903, formation of automobile manufacturing companies mushroomed in all parts of the United States. Of course, now the greatest automobile production comes from Michigan, and chiefly Detroit. Perhaps in number, Michigan contained more early experimenters than any other state. Nevertheless, during the first two decades of this century one found motor cars being manufactured in a dozen or so states.

According to statistics made up by *Motor* a number of years ago, there were thirty organized firms producing cars for market before 1900. This dozen included numerous individuals who, during the years prior to 1900, had made one or more cars. The data compiled by *Motor* further shows that there were 270 firms formed and producing and marketing cars from 1900 to 1910, which added to the thirty prior to 1900, made an even 300. Against this, however, 273 firms retired from the field in the same period. The profits were high, the fame enticing, the competition keen, and the casualties heavy. This was no business for a dilettante, for man whose ideas were fixed and not flexible. This was masculine competition at its best—and probably at its worst.

One is allowed to wonder what would have happened to the infant motor car industry had it been under Government controls, under the restraining thumbs of bureaucracies and bureaucrats. Speculation, financial and mental, was free and sometimes fairly wild. It gave full rein to a man's ambitions, offered him a chance of fortune beyond his wildest dreams, and opened up an inventive field that was never before and has never yet been surpassed. It could not have occurred under a bureaucratic weight. Never again, perhaps, will the world see free

enterprise at such a high and uninhibited peak.

In the two succeeding decades after 1910, automobile concerns came thick and fast and their span of life, for the most part, was much longer than in the preceding decade.

Where did the motor cars come from at that time? Suppose we break down a registered list of 978 of these companies and see. Out of the forty-eight states, motor cars were being produced in thirty-eight. Eight hundred sixty-one of the 978 companies were located in ten states, as follows:

(1) Michigan, (2) Ohio, (3) New York, (4) Illinois, (5) Indiana, (6) Pennsylvania, (7) Massachusetts, (8) New Jersey, (9) Missouri and (10) Wisconsin.

Out of that number, 518 of the companies were located in the first four states mentioned, as follows: Michigan 169; Ohio 124; New York 122; Illinois 103.

This left 343 companies for the six remaining states of Indiana, Pennsylvania, Massachusetts, New Jersey, Wisconsin, and Missouri.

Of the companies remaining in business at the end of 1946, practically all of them are in Michigan.

The names of motor cars that were household words at one time are now scarcely remembered. I doubt if there are many people under fifty years of age who can remember some of the motor cars made in Detroit alone, or the surrounding territory, in the early days. Among them:

Abbott-Detroit • Aerocar • Anhut • American Traveler • Austin • Blomstrom • Briggs-Detroiter • Briscoe • Brush • Carhartt • Cartercar • Chalmers • Daniels (Pontiac) • Dort • Durant • E-M-F • Everett • Flanders • Gray • Harroun • Herreshoff • Jackson • Jewett • Kelsey • Kermath • Lozier • Little • Liberty • Maxwell • Michigan • Northern • Oakland • Paige • Pungs-Finch • Queen • Regal • R-C-H • Reliable

• Reliance • Rickenbacker • Saxon • Scripps-Booth • Thomas-Detroit • Warren-Detroit • Wayne • Welch • Wills

A large volume would be required to record accurately the formation and activities of all of the automobile companies and the migrations of the various individuals from one company to another. Later these pages will concern themselves, briefly, with the beginnings and the history to the present of the less than a dozen firms making approximately nineteen different car models known by their trade names at the end of the war.

"HIGH HAT" LIST OF EARLY DAYS

It must be difficult for those of this generation to realize that only a few short years ago there were so many attractive, splendid motor cars advertised in what was known as the "high class" list. These cars were not the product of modern mass production, but they were all, or practically all, carefully built, sold at high prices, and many of them had gained a wide popularity with the public. Among them:

Alco (made by the American Locomotive Works) • American • Amplex • Austin • Apperson • Berliet • Brewster • Columbia • Cord • Cunningham • Duesenberg • Hewitt • Lafayette • Locomobile • Lozier • Marmon • Mercer • Matheson • Mercedes • McFarlan • National • Palmer-Singer • Pope-Toledo • Peerless • Royal • Ranier • Singer • Stutz • Speedwell • Stevens-Duryea • Stearns • Simplex • Thomas • Welch • Winton • Wills-Ste. Clair

These cars all had their vogue and many of them were made in quantity. Most of them dropped quickly from the market although some of them are still in use. Then there were the numerous cars the names of which were once household words, made in considerable quan-

tity and priced from $1500 to $2750. Among them:

Atlas • Autocar • Bartholomew • Berkshire • Blomstrom (Queen) • Chalmers • Chandler • Cleveland • Cole • Corbin • Daniels • Deere • Diamond T. • Dorris • Durant • Elmore • Erskine • Essex • Everett • Flanders • Franklin • Graham • Haynes • Herreshoff • Jackson • Jeffery • Jewett • Jordan • Kissel • K-R-I-T • Kline • Knox • Marion • Maxwell • Mitchell • Moline • Moon • Northern • Oakland • Overland • Paige • Pope-Hartford • Premier • Pullman • Rambler • Regal • Reo • Rickenbacker • Saxon • Stoddard-Dayton • Studebaker • Velie • Wescott • Winton

While some of these makers did not mass produce as did Winton, Haynes, Stoddard-Dayton, Chalmers, Chandler, Cole, Overland, Maxwell, Jeffery, Franklin, Reo and others, they were splendid, carefully assembled cars and good buys. They were produced in quantities up to 10,000 and more.

Of the more prominent individual pioneers whose car names were carried in the advertising pages of the magazines and newspapers for a great number of years, there are names every schoolboy once knew but are now forgotten. The output of many of these companies ran into the thousands yearly.

I knew most of these men personally. It is interesting to recall how far many of them went in the new business. They dropped out a few at a time through the years so that it is now easy to count on one hand those men of the earliest days still connected with the industry in a really active capacity.

Some of those names are still familiar to many. Mostly the pace was too swift. When that period wherein the balanced requisites of modern scientific manufacturing was reached, it called for a high order of executive ability, administration, financing, engineering and mass production. And then later, when the market passed from

active to passive, efficient salesmanship and distribution were necessary.

Much has been printed and said about individual accomplishments. As I have stated, I, luckily, happened to have a ringside seat which enabled me to review the whole parade, inasmuch as I was travelling over the United States locating so-called "motor car manufacturers" whom I found in all sorts of nooks and crannies in odd places, small shops, alleys, tumble-down and partially leased buildings. A few companies, engaged in other lines of manufacturing, attempted motor car production as a sideline. To my recollection, none of these succeeded. It was not a sideline business.

I frequently ran into Alfred Sloan, now Chairman of the Board of General Motors Corporation. We were rivals of a sort. He had a Hyatt roller bearing and I was introducing a Timken roller bearing. These products were wrapped in flannel and carried in our hip pockets.

I found it difficult to work up much interest among manufacturers in the Timken tapered roller bearing for use on axles and transmissions. Looking back now I chuckle at some of the weird opinions of early engineers who were hired simply because they *were* "engineers." There were and are as many different *kinds* of engineers as there are doctors. Some men who deal in anatomy are horse doctors, others are eye doctors and surgeons, still others deliver babies. So, then, with engineers. Any man who claimed to be an engineer of whatever sort, had a fair chance to enter the business of making motor cars in those earliest days. Research in metallurgy and all sorts of scientific test data were moons away from that period.

Some of these so-called "engineers" even said, "Timken tapered roller bearings will wedge going around the corners." We had to disprove this theory. We put on a demonstration at one of the early motor car shows

at Madison Square Garden by mounting a wagon wheel fitted with Timken tapered bearings, flat on the floor, loaded with sandbags, so that it would turn easily with a couple of fingers, to prove that it would not wedge. Successful? Yes.

EARLY BUYERS WERE "EXPERTS"

Buyers of motor cars today are little different from the first buyers. Many of the first customers were sure they were qualified to judge the points, good and bad, of a motor car. These opinions covered quite liberally everything from engineering and mechanics to the finished product. Plenty of trouble developed after some of these cars ran awhile but many did remarkably well. But at times the public was as bad, or worse, than some of the so-called experts, at least in the eyes of one company.

I believe it was the Wayne Automobile Company which sold a car to a buyer in another state. The buyer had some trouble with it. He exhausted his knowledge of the situation and then wrote a letter to the manufacturer explaining that he knew the mechanics of the car but, to make doubly sure, he called in three or four engineering "experts." They had all agreed that the parts under discussion were no good and that the car in general did not quite qualify. One of the officers of the company replied to the letter. He said that the car was as good as any one made at the time, and it was about as fool-proof as a car could be made; that the company guaranteed the car in use in the hands of owners for a reasonable period, but NOT against the opinion or use of the vehicle by "experts." The company later sent one of its men to look at the car. He found the trouble trivial, fixed it in a few moments and placed the board of "experts" in a rather embarrassing position. This sort of thing was not unusual in the early days.

In addition to the natural infirmities and weaknesses of an infant industry in its progress, there was, I must admit, some dirty work at the crossroads. All was not entirely cricket, as the British would say, in our young automobile industry. I recall hearing of one instance in which a pioneer motor manufacturer made a sale to an important and tremendously wealthy railroad tycoon of the Eastern seaboard. This sale was important because a purchase by this prominent man would undoubtedly influence sales of this make of car in and around New York City, which was then the great buyers' market. After a short while, the railroad man wrote an indignant letter complaining that his new car would not run. The manufacturer sent one of his experts to check. There was nothing wrong with the car—that is, with its mechanism. They found the car's carburetor had been filled with paint instead of gasoline. Naturally it would not spark. The error was rectified and the railroad tycoon made happy. The whole episode was probably referred to the "who dunnit" department.

It was all new and a matter of feeling the way. A matter of trial and error—chiefly error.

I remember many instances demonstrating the energy, initiative and quick thinking of some of those sturdy pioneers. Back in the early days when we went to motor shows, it was the custom of manufacturers to arrive with their engineers and perhaps a casual shopman or two. If they had prepared a new car blueprint in advance they exhibited and took orders for cars as per print. In some instances in the very early period they even waited until they arrived at the show before drawing the picture of the "model" they "thought" they would produce the next year.

And, of course, opportunity was knocking on the doors of those early "shops" as it never had importuned at the door of any new industry. It was about 1904 or 1905, I

believe, that the Adams-Farwell Company, of Dubuque, Iowa (a firm name of which most of you have never heard), was making a 5-cylinder, air-cooled, radial motor which was mounted over the rear axle for more direct power application. Note this: that firm was, in theory at least, 50 years ahead of its time. You see, at the present time, 1947, the tendency seems to be to get back to power application at the most effective point. Many of our cars of the future will probably have their power applied right at the rear axle. Adams-Farwell certainly pioneered the idea.

That year (about 1904) was when the first blueprint appeared showing a motor car with rear "tonneau entrance." That was for the rear seat only. The idea seemed to make a hit at the show, so Adams and Farwell were up against it. The only way they could have gotten into the back seat from the rear of their car would be to erect a "country stile" steps up, over and down.

The boys were in a dither for a few days, then came up with the answer. They showed me a sketch (I think it was the first in the United States) of a side entrance into the rear seat compartment. Old necessity was again the Mother of Invention.

THEY USED "LONG TELESCOPE"

Another instance of vision occurred one day when I was calling on Nordyke and Marmon, at Indianapolis. Howard Marmon asked me to hang around until the noon hour struck. At that time he led me through the plants and across the yards to a shed. He unlocked a couple of padlocks, locked them again and took me to a chassis structure already mounted on wheels. Here he used some more keys to unlock the hood and showed me a "V-8 cylinder, air-cooled motor," surely an advanced step at that time.

Engineers were beginning to figure on engine design of different type—one which would produce more power.

They had not, of course, reached the refinements of today where added power is secured out of the same type engine each year. So the trend was—how to get and how to place more cylinders.

At about this same period, I was in New York. Edward R. Hewitt, son of Peter Cooper Hewitt, former mayor of New York and one of its early outstanding citizens, asked me if I woud take a ride with him the following Sunday, and I accepted. He arrived at my hotel with one of the longest wheel-base cars I had ever seen. We drove up through New York and out the drive, as far as Spuyten Duyvil, and climbed the many steep hills along the route. The car took them like a breeze—an extraordinary experience in those days. I was inquisitive and Ed drove up a lane, got out his keys, unlocked the hood and showed me twelve cylinders—all in a row! I never knew how he worked out the crankshaft problem, but, I believe he was one of the first to build and drive a car with twelve cylinders in a row.

Another day I went into his shop to ask for him. I could not recognize Hewitt. He wore a Van Dyke beard. I saw a lot of sweaty fellows with overalls on, and no shirts. Finally, they pointed out Hewitt. He was working in front of a furnace. He was muttering with excitement. "I got it! I got it! I got it" he kept saying, and then, calmer, he explained that he was working out a new steel heat treatment. He was as black and sweaty as anyone in the shop.

The early motor car pioneers worked that way. They didn't mind a little dirt or a little sweat if they got results.

Among the early and most famous steam cars was the Stanley Steamer, made at West Newton, Massachusetts. On one of my trips down there, Stanley asked me if I wanted to ride a mile a minute. That was something unheard of at that time. He said he had perfected

HOWARD C. MARMON

F. O. STANLEY

WALTER C. WHITE

CHARLES B. KING

. . . ENERGY AND RESOURCEFULNESS . . .

Some pioneers whose cars . . . steam or gas . . . bore their names.

ANDREW L. RIKER

FRANK B. STEARNS

LEWIS H. KITTREDGE

THOMAS B. JEFFERY

. . . PLUS PRODIGIOUS COURAGE . . .

As early as 1895 the above were testing their own cars.

a new steam car and he whirled me through the boulevard system of Boston and into the outskirts. We had none of the modern refinements which were to follow—windshields, comfortable seats and such. I was wearing nose-fitting glasses and these were plastered down against my eyes so quickly that I could see nothing. According to a speedometer, the car hit 59 miles per hour—speed aplenty for me. I told him I had had enough and suggested that we do it again—never.

An offshoot of the Stanley Steamer was a steam car made by a relation of Stanley's, Louis Ross, whose hobby was fire departments. His house in West Newton had the full electrical clock arrangement and all the appurtenances and gadgets the department had in its headquarters in Boston. His clothes were arranged firemanlike at his bedside, so that he could jump into them when the Boston alarm sounded. A press button automatically lighted up the house as well as the burner under his steam car in the garage and opened the garage doors. He was always among the first to arrive at the scene of a fire. Of course, he had press and fire passes—permitting him inside the fire lines.

TWO MILES IN ONE MINUTE

Louis Ross developed his steam car into a racer and entered it in the Ormond Beach Races, an annual cup event. The construction of the car, its appearance, was so odd and irregular that it evoked protest from all the other entrants, particularly the steam car people. After a day of hearings, he was permitted to enter and run. He was the first man to go two miles in one minute with a motor car.

We made a special set of axles for Ross who had built a car for the chief of the Boston Fire Department. On one of my visits to Boston, Ross took me to fire department headquarters and the chief took us on a ride in

his new car. It was a never-to-be-forgotten experience. I was not prepared. I thought we were simply going to drive around the streets. Not so. We dashed out with bells clanging and whistles blowing and for the next ten minutes I was busily trying to hold my breath, keep my hat and my glasses on, while watching the natives along Boston's narrow, torturous lanes practically climb telephone poles to get out of the way. It was a wild ride but a great demonstration of flexibility, speed and even power flow. Ross was in his element. More fires gave added opportunity for high speed which was his desire.

Then there was Charles Duryea and his brother, Frank, who made a three-cylinder, air-cooled motor, which was adjacent to the rear axle. Their plant was at Reading, Pennsylvania. They were probably among the first men in America to apply the principle of the "jump spark." The first few cars they made had two rear wheels and one wheel in front. The steering was done with a lever, or tiller. The body was shaped like a horn-of-plenty, each side being formed to look like a mermaid. They sold a number of these queer looking cars and then finally put the orthodox two wheels in front. There was a control stick located in the middle of the car at the driver's left hand, similar to some of our early airplane controls. The car did something with every move of the stick; often something unexpected. There was a button to press down at the top of the steering tiller. The car had flexible control and two doors. When one of the Duryeas took me out on the run to the top of Mt. Penn, a high mountain full of hairpin turns, he told me he was going clear to the top in high gear. I assured him it couldn't be done and probably never would be. Duryea was not boasting. He did it.

The next year, Duryea was deluged with orders and made several hundred cars. The capital they had attracted insisted that they make their car look something like other

cars being produced. They refused to do so and continued making the old mermaid body design. This refusal to follow convention was a mistake. They faded out of the picture. They could have been among the leading motor car makers of the day.

One time, on a visit down East, one of the officials of Stevens-Duryea took me through that portion of the plant devoted to the manufacture of cars. During the trip he said, "What makes those fellows out in Detroit think they can make automobiles? It requires the utmost in mechanical skill, and all the good mechanics in the United States are located in New England. They will never get to first base in Detroit, for that reason."

I wonder what he thinks today. Apropos of this, the airplane manufacturers of the West let up a mighty yell during the war that Detroit would never be able to make airplanes for the simple reason that all the airplane know-how was in the West. On the same principle, old line shipbuilders derided the efforts of amateurs to make ships. They said the new ships would have no "manners." However well or ill mannered these ships made by "amateurs" were, they sailed the seven seas in numbers such as the old ship makers could not have hoped to make in a thousand and one years.

Detroit, in those early days, did not have the mechanical know-how in abundance, but its men had the genius and the will. They invented the know-how.

CHAPTER 4

Races, Shows and Tours Spur Better Cars, Good Roads

During the recent Golden Jubilee, through the courtesy of J. O. Eaton, I was sent an attractive pamphlet titled "A Chronicle of the Automotive Industry in America from 1893 to 1946." Two figures in this pamphlet caught my eye. In 1900, 4,192 automobiles were produced in the United States. No trucks. In 1940, America produced 3,692,328 cars and 777,026 trucks. Then, of course, the country went into war production, and in 1943 civilian production of cars was registered as none.

These figures leap to the eye and one immediately assumes that the astounding success of the automobile industry was due to the creative genius and energy of automobile men alone, which would not be true at all. In order to reach its astounding figure of production and sales, the automobile had to become immensely popular, and in order to become popular, it had to have fine roads over which to travel.

Numerous things contributed to bring about the unrivalled system of roads in America. But before good roads could be built, there had to be a public clamor for them. They cost a lot of money. And before the public could be educated to the need of good roads, there had to be a popular demand for automobiles. The Automobile Shows held in New York and Chicago were primarily to interest the public in automobiles and make people want to own them. These shows were sponsored by the National Automobile Chamber of Commerce of which

the late Roy D. Chapin was Chairman of the Good Roads Committee. Then there were the Road Reliability Runs. These runs were intended to try the new cars under all conditions, test new methods and inventions and whip the mechanical "bugs" as they developed. They were sponsored by the early companies and conducted by company men. Behind the idea was the ever-present desire to improve and sell automobiles and the runs were designed primarily to make the public automobile conscious and inspire confidence in the Horseless Carriage.

The Vanderbilt Cup Races and the Indianapolis Speedway had, in varying degree, much the same objects in mind. These events had much to do with giving America superb roads and fine automobiles.

I deal here first with the Glidden Tours not because the event was of more importance than the others, but because it has been so recently in the public mind as a result of the so-called "tour" during the Golden Jubilee.

Charles J. Glidden, aside from the Automobile Club of America, was the original individual sponsor of America's fine roads, and every person in America today owes him and his hobby a vast debt of gratitude. Glidden was a retired varnish manufacturer from Boston. He had amassed a fortune through his association with Prof. A. Graham Bell in establishing telephone lines in New England. He had leisure and money, and was a good road enthusiast. Long before he established his now famous Glidden Tours, he was chugging slowly and painfully through the mudholes on the roads out of New York. Whether or not he was lonely—whether or not he took delight in luring others on to these vast stretches of muddy roads, is beside the point. He made so many automobile journeys forty-odd years ago, beginning with a long drive from New York to Philadelphia, that he was inspired to let others in on "the joys of the open road." And so began the famous Glidden Tours which

were the delight and sorrow of automobilists, small towners and farmers from 1905 to 1913, and were one of the direct inspirations for America's unsurpassed road system. The central idea behind the tours was that they would be held in different sections of the United States each year under all kinds of road conditions. One year, for instance, the tour might be run over mountainous territory; the next in low country where mud and swamp land might be encountered and the next over the sands of the desert or soft prairie. The idea was, further, to impress the public with the feasibility and enjoyability of automobile travel.

THE FIRST "SPEED TRAPS"

Under the direction of the American Automobile Association, he offered a large silver cup for the winner of an annual national road tour. The course meandered from New York to Bretton Woods, New Hampshire, in all, approximately one thousand miles of twists and turns. Manufacturers recognized the publicity possibilities of these tours and nearly all the big automobile men, including R. E. Olds, Percy Pierce, Walter White and John D. Maxwell entered. They had fun and plenty of grief. Immediately Glidden Tour members and the American Automobile Association went on the sucker lists of the small towns between New York and Bretton Woods, and the first speed traps were born. Farmers intensely disliked these intruders, but they profited enormously. They charged exorbitant prices for hauling in casualties—and there were many of these. In some ininstances it is reported they even contrived accidents.

The villages simply put the heat on. Almost every village was a speed trap, and every tourist was a prime sucker in the eyes of the village constable and justice of the peace. If he drove through the village at five miles an hour and could not be considered a speeder, then the

driver was arrested for disturbing the peace—for frightening horses or obstructing the road.

There was one woman driver in the first Glidden Tour—Mrs. John Cuneo of New York. She became a casualty the first day out, by running into another contestant stalled on a narrow bridge and tipping her own car in a creek.

With all these hazards, several automobiles finished the course, much to the surprise of the promoters of the first Tour. Percy Pierce with his Pierce-Arrow Buffalo was awarded the Glidden Trophy for that first year.

The next year there was a much larger entry list. The manufacturers had learned through the first Tour a great deal about bad roads and bad cars and immediately began to do something to correct these things. The first Tour was a haphazard business as far as rules were concerned, but the second year a strict set of rules was laid down. For instance, rules were made penalizing contestants for recourse to horses to haul them out of ditches or mudholes. The second course was a zig-zag affair. It started at Buffalo, meandered in and out of Canada, and finally wound up at Bretton Woods. Casualties that year included the burning of two steamers. Webb Jay's steamer burned on the first day, and Walter White's steam car went up in flames the next. Among the gas driven vehicles included in this Tour, were W. C. Durant's Buick and the Lozier of Harry Lozier.

Again, and in the next few years, Percy Pierce won the Trophy with great consistency, and Americans became thoroughly Pierce Arrow conscious.

These tours were supposed to demonstrate the worth and stability of the various makes of cars. The event was always headed by Charles Glidden himself, and there were always plenty of mechanics and engineers along to record the performances of the various cars. While the cars were supposed to be stock models, and only limited

repairs could be made enroute, according to the rules, nevertheless, there were plenty of bright young men scattered along the route at strategic places were necessary "road repairs" could be made. Sometimes these "road repairs" might consist of anything from a new engine or a new radiator to a transmission and a set of springs. A few suspected that some may have planted entirely new cars along the way, and switched.

Some Detroit manufacturers invited criticism by refusing to enter these contests, but there was considerable method in this decision. A few at first refused to enter cars in the Glidden Tours. The heads of these concerns had realized that the publicity was bad. The public was making jokes about the grief which came to the contestants and the newspapers were playing this grief and these jokes in blacker type than the names and ability and stamina of the cars.

These Glidden Tours which did so much for good roads kept up annually until 1913. They had served their purpose and the public and automobile manufacturers lost interest. As I have said, they were resumed in 1946, but this was purely a pleasure undertaking and the entrants were men who have made a hobby of collecting antique automobiles. But nobody can question the direct and immense influence Charles Glidden and his hobby had on good roads; and, of course, indirectly on the volume manufacture of automobiles, because without good roads to drive on the volume of cars made could not have possibly jumped from a few thousand to several million per year.

Another factor in popularizing automobiles were the national automobile shows. The first one was held in Madison Square Garden in 1900 and, as previously stated, exhibited 34 cars of all kinds and types—gas, steam and electric. These shows grew in popularity and dramatic interest. In later years enough space could not

be found to accommodate all the exhibitors. The annual shows at the Garden and at the Coliseum in Chicago were gathering places for everyone connected with the motor car business in any way. All the manufacturers with their engineers and purchasing agents, and, of course, the salesmen, and all the accessory men who made component parts or units were there. The public flocked to these shows, crowding them to capacity.

SOCIETY FLOCKS TO AUTO SHOWS

The prime object, as stated, of these very earliest shows was to let the public see motor cars. However, at the very first, these shows were made more or less social events. To illustrate this, I quote from the first issue of *Automobile Topics:*

"The automobile has been extensively taken up by society and, during the past season in Newport and Lenox, it played a most important part in social life. Women like Mrs. Stuyvesant Fish, Mrs. Herman Oelrichs, Mrs. William G. Vanderbilt, Jr., and others who were noted for their daring in taking up sports which have the merit of unconventionality, will not be satisfied until they have driven their motor carriages through the city streets."

And another from the same issue:

"William G. Vanderbilt, Jr. presented a novel appearance when he arrived in the city at eleven o'clock at night after his ride from Newport in his Daimler gasoline machine. He was attired in leather jacket, large goggles over his eyes, and a patent leather cap. Accompanying him were his French chauffeur and a footman. Mr. Vanderbilt took no account of miles an hour for he was delayed by rain and going much out of his way by not knowing the roads. He thinks his fastest time was at the rate of about forty miles an hour.

"At the first general meeting of the Automobile Club

of America October 16, 1899, Mr. George F. Chamberlain agitated the question of holding a specific automobile exposition in the City of New York. Heretofore automobiles have been shown in this country only in conjunction either with electric, bicycle or carriage expositions. . . . Mr. Albert C. Bostwick had completed his arrangements in securing the use of Madison Square Garden to hold the first annual show of the Automobile Club of America. A circular track one-eighth mile long and twenty feet wide will be used for contests of stopping, starting, turning and driving between obstacles."

New York was the center, in a way, of the new automobile activity because there was more wealth in New York, more society, and more people were inclined to "play" with new things and toys. Also, automobile manufacturers, always ready to take advantage of opportunity, saw that the social prominence of such names as Vanderbilt, Stuyvesant, Oelrichs and others meant invaluable publicity for their cars. So the first show, while, of course, it had a long-range view, was aimed directly at these immensely wealthy New York socialites.

The Oyster Bay Roosevelts, including the not-yet president, Theodore Roosevelt, were early interested in automobiles and the Madison Square Garden Automobile Show. During his first term, President Roosevelt was a passenger in a race to Irvington-on-Hudson, and a New York newspaper commented that the ride was "in keeping with his usual daring."

BARNUM BOUGHT CAR AS "FREAK"

Remember, in the year of the first Madison Square Garden Show, if a horseless carriage appeared on the street in any town, it was regarded very much as the two-headed man in the circus. As a matter of fact, it was such a curiosity that Barnum and Bailey bought one of the first cars and exhibited it much as if it were a

freak—which it was. Many people in various sections of the country had never seen a motor car. Furthermore, the people had to be convinced that the things would run. So, as stated, in the old Madison Square Garden a track was laid out on the floor level space on the outer rim, and demonstrations were given to prove that the cars would run (some of them didn't), and also to give the spectators the thrill of their first ride in these new contraptions.

In those early days many so-called motor car builders went to these shows with nothing more than a blueprint. After looking around for several days and keeping notes and checking car models on the floor, decisions were made as to the essential form and detail their cars were to follow.

It took several years for many of them to learn that they could not design a car in December and have it on the market early in the following summer—just exactly what many of them planned in those early days. The fact that they could buy many of the units—motors, accessories, frames and springs—misled them in making their optimistic plans. They completely overlooked the fact that the parts makers had to go through all of the engineering and mechanical motions for them—and dozens of others—at the same time.

If any of the visitors to those early motor shows were mechanically minded and knew enough to make intelligent inquiries about motor cars, for instance, about engines or transmissions, they were immediately shown blue prints.

It was not an uncommon sight to see the bonnets or hoods of the cars nicely decorated with criss-crossed bright colored ribbons which were tied and firmly knotted to the frame on each side. Reason: there was no motor in the car, often no transmission. The main idea was to get a frame with springs, axles, top and dash-

board, with the steering gear sticking up in it, and somehow get it to the show. It was pretty but, as it stood, entirely useless.

EDISON, STEINMETZ INTERESTED

Much more so than now, sales were made mostly on the general appearance of the car. Nobody much outside of the motor industry itself knew anything about automobiles. The fine balance of weight, horsepower, and other important engineering requirements were yet to come. These shows attracted all the notables of the industry as well as prominent people from most of the cities in the United States. The hotels in New York were jammed during show week. I had the opportunity of meeting many notable people from all over the country, most of whom showed a keen interest in the mechanical parts that made up the motor car. I cherish the memory of a lengthy visit with Thomas Edison at our booth in those early days. He said he had heard of the Timken Tapered Roller Bearing but had never seen it. After looking at it a few moments, he asked dozens of pertinent, pointed questions, and we all were impressed with the final nod of his head when he said, "That bearing is all right in principle and if made with good steel will give a satisfactory account of itself."

Another one of those early visitors was a scientist, Charles Steinmetz, whose name is indelibly written in the annals of electrical engineering. Like Edison, he quickly asked all the leading questions, and, it might be added, gave his approval. He was slightly hunchbacked, had piercing eyes and an engaging magnetic personality. He constantly smoked Pittsburgh stogies which attracted him to me, as I also was an addict.

Early one morning I went down on the floor to see Alexander Winton. Very few visitors were around. One, a loud, talkative sort, had shown up at the Winton ex-

hibit and was displaying his intimate, expert knowledge of motor cars in general, and the Winton car in particular, to a man attached to the exhibit whom I recognized as Barney Oldfield. Everyone remembers Barney as one of our early speed kings. Barney probably knew as much about motor car mechanics as anyone in the business—and knew that he knew it. He was never terrifically modest. So I took pleasure in listening to the visitor who was giving the speed king considerable unasked-for advice. He backed up his lecture to Barney with a flat statement that he had driven motor cars hundreds of miles and knew what he was talking about. He ended by finally turning to Barney and saying, "If you had had as much experience as I have had in driving cars, you might understand what I am talking about." Then added, "Have you done much driving?"

Barney's chest expanded. He looked the visitor straight in the eye and said: "Yes, son, I have."

"Doing what?" the man asked.

Barney replied, "Did you ever hear of Barney Oldfield?"

The visitor, puzzled, shook his head slowly. "No, don't think I ever did."

That was too much for Barney. He simply said, "Oh, hell!" turned and walked away. His ego was entirely deflated.

Then, there were the Road Reliability Runs that the early companies sponsored with their own men so as to be the first to run a motor car from one point to another, this city to that. Quite a few manufacturers hired stunt and race drivers to participate in these trips which were always attended with daily newspaper publicity.

This was all advertising of a kind. For the most part, however, when the new motor car-owning public at-

tempted to use the impossible roads of the day, it soon found that trips much beyond the town limits were fraught with real adventure, and were a much-needed addition to their mechanical education. So a persistent cry for good roads began to rise over the land. Mud roads and ungraded hills furnished heroic tests for these first creations of the baby industry which had not yet dreamed of research laboratories. Improvement came by the hard old trial and error method.

PUBLIC CLAMORS FOR GOOD ROADS

The late Roy D. Chapin was chairman of the National Automobile Chamber of Commerce Good Roads Committee. He worked faithfully and long in that capacity and was responsible for much of the early interest in good roads.

Henry B. Joy can be given much credit for good roads. He was president of the Lincoln Highway Association for many years. Joy was as enthusiastic and energetic in pursuing this necessary work, as he was in everything he ever undertook. The proposal of a paved highway all across the United States from the Atlantic to the Pacific was an undertaking that appealed to the imagination of practically everyone. This first great road construction, pioneered by Carl G. Fisher, did not come easily. There were many obstacles to overcome, legal and otherwise, in the various states which the highway would traverse. The matter of right-of-way was one obstacle to be hurdled, many farmers and town dwellers objecting, even with shotguns and buckshot, to the "trespass" of these early road engineers and surveyors. But the dream came true, and then state after state became interested and boosters, as commercial travel benefits became apparent.

William K. Vanderbilt, Jr. drove a mile in 39 seconds on Ormond Beach, Florida, in a car of German make, in 1904. The interest of this sportsman and the develop-

ment of the automobile resulted in the Vanderbilt Cup Races, inaugurated in October of 1904, which were run chiefly in the East, over the roads of Long Island, New York, and vicinity, and this whetted the motoring appetite of the public greatly. The entries in these early races usually included makes of all the famous foreign cars as well as American cars. American manufacturers wanted to test their products with the best of Europe and, incidentally, to pick up any ideas which might be lying around. The races usually started at six o'clock in the morning and, after the first ones, became so popular that a couple of hundred thousand people usually camped along the course all night in order to be on hand to see the races go by.

SPEEDWAY TEACHES ENGINEERS

The Vanderbilt Cup Contest which had been sanctioned by the American Automobile Association had to be abandoned later because of inability to control the crowds. People risked their lives crowding out into the highway all along the course, and it was impossible to furnish enough guards to police the roads. The result was that only a narrow lane was left for the contestants.

The Long Island course was abandoned in 1911, the event being combined at Savannah, Georgia, with a similar event sponsored by the newly-formed Automobile Club of America. The races were run on different days and this practice continued up to and including 1916, when both cups were withdrawn from competition.

Another event that did much to stir and keep popular interest alive, at the same time assisting materially in developing stability and endurance in the different component parts of the motor car, was the Indianapolis Speedway, the construction of which was completed by Carl G. Fisher in 1909. These events were usually held on May 30, Decoration Day, from 1909 until they were

suspended at the beginning of World War II. These Speedway races were held annually. They were resumed in 1946.

Indianapolis was the mecca for 100,000 or more people who trekked there each year to see the daredevil performance of the "speed kings" of this country and Europe.

A great deal of valuable engineering data resulted from these contests, all of which was promptly incorporated in the products of the various manufacturers.

Carl G. Fisher, the father of the Speedway, rose to fame and riches with his Presto-Lite lighting system. He, incidentally, brought greater fame and popularity to Miami as a winter resort by his fabulous development operations in pumping land from the sea and building high class residential islands.

In the speedway operation he was associated with James G. Allison, a partner in Presto-Lite; Frank Wheeler, president of the Wheeler & Shebler Carbureter Company, and A. C. Newby, president of the National Vehicle Company which made the National Automobile.

The first race on the speedway was in 1909 and was won by a car making an average of 76 miles an hour.

The 500-mile course of the speedway was paved in 1911. In 1937, the winner made an average speed of well over 100 miles an hour, some laps being made at the rate of 132 miles an hour.

The speedway contributed greatly to engineering and mechanical data to guide in the designing and building of motor cars. Year by year, as the speed of cars increased, the engineers began cutting down the size of the engines and adding superchargers.

Fisher later became interested in a real estate development on Montauk Point, Long Island, New York. It looked rosy, but it was an enormous development and soaked up money faster than it could be found. At the

beginning of the first World War, Carl Fisher owed Indianapolis banks more than one million dollars. These loans—and others— were called, and he was given two weeks in which to lift his paper. He was a heavy supplier of his Presto-Lite tanks to the Ford Motor Company, and it is said that his receivable and future requirements with that company provided the funds that permitted Fisher to pay off his loan on the last day of the two-week period. Because of the pressing demands of his Montauk development, Fisher sold his Speedway interest to his partner, James Allison. Allison also purchased Wheeler's interest. A. C. Newby passed on a few years later, and Allison took over his interest. Allison died about 1936. Eddie Rickenbacker bought the Speedway, put out a bond issue which was paid off in orderly fashion, leaving Rick the sole owner of the Speedway.

Carl Fisher was ill for many years before he died in 1937. His huge fortune was completely gone.

RICKENBACKER SELLS OUT

Rickenbacker's Eastern Air Lines and other aviation interests began to demand increased attention shortly after his purchase of the Speedway. These demands became such, during the war and immediately at its conclusion, that he could not give further attention to the Speedway project.

Wilbur Shaw, three-time winner of the 500-Mile event, had always had a yen to own and direct the Indianapolis Speedway. Rickenbacker had paid $700,000 for it in 1927 and Shaw found that he could purchase it for about $750,000. It is said that he listed a number of names from whom he might get at least $25,000 each, to form a syndicate for the purchase. On the list was Anton Hulman, Jr., of Terre Haute, Indiana, a well-known business man, financier and sportsman. Hulman was outstanding in Yale athletics, particu-

larly on the track teams. On being approached with the subject, he told Shaw he would buy it, himself, if he (Shaw) would run it. That was precisely what Shaw wanted to do. The deal was consummated in November 1945.

The Speedway classic will continue to be one of the outstanding Memorial Day sporting events.

The public and the official law-making mind has come far on the question of speed, lawful and otherwise, since 1900. For a long period the speed of the bicycle was something at which to marvel. "Scorching" meant anything going faster than the ordinary horse could trot on the public streets. Some speed laws enacted during the bicycle era carried over to the days of the motor car.

Charles C. Bowen, the late president of the Standard Accident Insurance Company, of Detroit, had an experience in 1907 which illustrates this point. His father, Lem W. Bowen, was president of the Cadillac Automobile Company from 1903 to 1910. He was also president of the Detroit Board of Commerce. In the latter capacity, he had issued public criticism of the laxity of judges in convicting speed offenders, and their leniency when the culprit was found guilty. One day Charles C. Bowen, the son, was rolling across Belle Isle Bridge in one of those early vintage, single-cylinder Cadillac cars. He was going, as near as could be judged, from 12 to 15 miles an hour. The City Ordinance regulated speeds at from eight to ten miles an hour. Charles was arrested. The policeman "estimated" that he was exceeding the legal limit. There were few reliable speedometers in those days.

Charles and his father appeared in court, and the "culprit" was given a severe reprimand and a lecture in which the father was made to understand that here was a case where conviction was certain and penalty was going to get careful attention. The judge thereupon gave Bowen the option of paying $200 fine or spending 30 days

in jail. So the elder Bowen paid the fine and said that he was satisfied; that he had his money's worth, even though it was unfair, as he felt that his criticism had stirred public interest in the handling of all kinds of violations by the courts.

PROGRESS

The three-wheeler above is said to have carried the first all-steel body ever made. It was an electric with the first Willard storage battery and was assembled by the Eastman Company. The body was made by Wilson and Hayes Manufacturing Company of Cleveland, Ohio.

CHAPTER 5

Competition Whittles 2200 Car Models Down to Present 22

It would be impossible to deal even casually with the history of 1100 recognized builders of motor cars which came and went during the first two decades in which the motor industry was aborning. A major part of the public today is familiar with the industry only to the extent that it knows the names of the corporations which make certain standard cars. It is my intention to deal in the following pages with the modern motor cars known to the public today—their births and history—as adequately and accurately as my memory and my files permit. It is my hope and belief that such a record will reveal interesting incidents in the formation and growth of the companies, and perhaps the brief biographical sketches of the men involved which I offer will add something to the already voluminous record of the giants of the automobile industry—some of whom were prominent in the field and some who still are.

Here is the list:

American Bantam Car Company, Butler, Pennsylvania
Chrysler Corporation, Detroit, Michigan
Ford Motor Company, Detroit, Michigan
General Motors Corporation, Detroit, Michigan
Graham-Paige Motors Corporation, Detroit, Michigan
Hudson Motor Car Company, Detroit, Michigan
Nash-Kelvinator Corporation, Detroit, Michigan
Packard Motor Car Company, Detroit, Michigan
Studebaker Corporation, South Bend, Indiana

Willys-Overland Corporation, Toledo, Ohio
Kaiser-Frazer Corporation, Willow Run, Michigan

Eleven companies in all, which is quite a drop from the original eleven hundred. The trade names of the car models with which today's public are familiar, are:

Bantam • Buick • Cadillac • Chevrolet • Chrysler • DeSoto • Dodge • Ford • Graham-Paige • Hudson • Lincoln • Mercury • Nash • Oldsmobile • Packard • Plymouth • Pontiac • Studebaker • Willys • Kaiser • Frazer • Crosley

Twenty-two names of models in all, the total list of survivors from overall listings that aggregate twenty-two hundred over the years.

CHAPTER 6

Inventive Genius of Dave Buick Made Many Fortunes

David Dunbar Buick was a paradox—a more or less practical dreamer. By all the laws of averages, he should have made a dozen fabulous fortunes for himself. He did make half a hundred fortunes for other and lesser men. He died broke.

Newspapers seem to revel in the riches-to-rags motif as well as the rags-to-riches theme. During his career, David Buick furnished several headlines, most of which were to the effect that he had once been a millionaire and was broke. He seemed to have the "dark talent"; which is to say that he had the ability to make money, but he had no success in keeping it. He cared little for money, his whole life being engrossed with ideas. He left the motor car business quite a rich man. His later investments were not successful.

He was an inventor with remarkable versatility. In addition to his contribution in the automobile field, he gave more than his share to American good living. Of course, his name will always be associated with the car which bears his name. His lesser known and more prosaic contribution, however, was the enameled bathtub. He had invented a lawn sprinkler while he was a very young man, and during the years that followed he secured patents on a number of valves, tanks, and other gadgets having to do with indoor toilets. That does not sound terrifically glamorous but it did make for more comfortable and more sanitary living. A group of German manufacturers had a closely guarded secret. This was a

method of applying enamel to the surface of cast iron bathtubs. Buick invented his own method of doing this highly essential job in America. It was a commercial success and, had he devoted himself to this work, would have probably become one of Detroit's first millionaires. There was some talk of organizing an American syndicate, but Buick failed to follow through.

He had inventive genius but little business sense. Once he had invented a thing, he lost interest.

AN INSPIRING LETTER

There is a wide-spread misapprehension about inventors making big money. With few exceptions—notably Thomas Edison — inventors, as such, have not made enormous fortunes. Buick was no exception. Before I go into Buick's connection with the automobile industry, I want to make an unqualified statement. Would that I could live a life that would elicit a letter such as David Dunbar Buick received in the last days of his life when he was, to all intents and purposes, broke and down-and-out. I believe that I should treasure such a letter above all things and accomplishments. The letter in full follows:

Wayburn, Saskatchewan, Canada
February 5, 1928

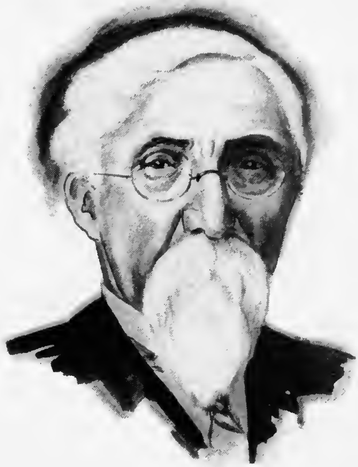
David D. Buick, Esquire
Detroit, Michigan

Dear Sir:

Having read an interview given by you to a newspaper correspondent, I was more than moved to sympathy, if I might put it that way.

I quite understand that a man of your type craves neither charity or sympathy, but I notice in the interview you said you would like security.

DAVID D. BUICK



HENRY M. LELAND

EUGENE W. LEWIS

HERBERT W. ALDEN

. . . MADE OUR FREE ENTERPRISE . . .

A great inventor, a master precision craftsman, the Author as a young man and his friend and former business associate.

WILLIAM C. DURANT

HENRY FORD

JOHN M. STUDEBAKER

J. W. PACKARD

. . . THE GOAL OF NATIONS . . .

Cars these famous men made circled the Globe.

Now, I am a stationary engineer holding a fairly good position with the Saskatchewan Government. I am married, but have no children and would like to say to you from the bottom of my heart that I will offer you a home and my care at any time you feel that you would like to quit your present vocation and take things easier.

If you get incapacitated or out of funds please let me know, and I will do my best, in fact my utmost, for you and will send you enough money at any time to get you to my home, which shall be your home as long as you wish it. Please don't think this is the kind of charity you don't like to accept, as I would only think it my duty even as a stranger who has never met you. Merit is not rewarded as it should be very often. It is one of the unfortunate things of life that the one most deserving very often gets the least acknowledgment.

If I can impress on you that my invitation and wishes for your future are sincere, I shall be glad to do anything I possibly can for you at any time.

Hoping you will pardon me for writing to you on account of being a stranger, but I felt that at least if I could give you any security for your future, I should be doing a little at least to repay for the merit due you which has not been recognized.

Yours very sincerely

(Signed) Gordon E. Mann

The milk of human kindness still flows, as demonstrated by the above letter. In its gentle humaneness, in its respectful offer of assistance to a gentleman of genius to

whom the world and circumstances had not been too kind is embodied the spirit of the brotherhood of man. If the world would follow the example of kindly, friendly, gentle, understanding Gordon E. Mann, it would be filled with Men of Good Will—and would have little reason to be terrorized at the thought of the Atomic Bomb—or anything the future may hold.

This letter was received one year, to the day, before Buick died.

BUGGY MEN BECOME CAR BUILDERS

The Buick had its beginnings way back in the very early days of motor vehicle experiments.

David D. Buick was associated with the Sherwood Brass Company, then known as Buick & Sherwood. He had produced a number of inventions which brought in sufficient income to supply funds for constructing many of the mechanical gadgets and devices that flowed from his active, inventive brain. In 1901, he sold his interest in Buick & Sherwood, and some of his patents, for $100,000. With this capital he was free to spend his time and money actually producing the things of which he dreamed.

He continued his work and experiments in the rear of his home on Meldrum Avenue, Detroit, assisted by his son, Tom. In three years he saw his capital fade away. For this expenditure of time and money, he had a valve-in-head motor plant and an engine that worked, and a new style of "buggy" to carry it and to be propelled by it.

He advertised in the Detroit papers for a partner and fresh capital. Among the letters that came in was one from J. H. Whiting, a Flint banker and carriage manufacturer. To demonstrate that he had something, Dave finally succeeded in driving his car to Flint, completing the required demonstration. Whiting put up $35,000. A company was organized with Buick holding

the majority of the stock. This operation was conducted in a small building across from the Flint Wagon Works plant.

The Flint men, all executives of the Flint Wagon Works, were: J. H. Whiting, W. S. Ballenger, C. M. Begole, Charles A. Cummings, William Beacraft, Walter Marr and William Wascher.

The first complete Buick car was sold about July 1, 1904, to Dr. H. H. Hills, of Flint. Nearly two months were consumed in manufacturing it, as the prospective purchaser looked on impatiently. The doctor used this car for four years before selling it.

One Sunday, Dr. Hills took W. C. Durant and Mrs. Durant for a ride. Mr. Durant was very much impressed with the demonstration and the well-known Durant imagination and vision could see great possibilities in the car. That same year, Durant purchased control of the company and a little later moved it to Jackson where larger quarters were available. The company enjoyed a fairly successful operation in Jackson but it was found desirable to move the plant back to Flint.

FLINT BECOMES MOTOR CONSCIOUS

Business men placed their fortunes at the disposal of Durant and the Buick Company. Laborers, clerks and others mortgaged their homes to buy stock in the enterprise. Soon construction of buildings was started and Flint's transformation from the Vehicle City, as it had become known, through the manufacture of carriages and road carts, to a motor city, had begun. The 2-cylinder design, under the impetus of more business and additional experience, was soon changed to the 4-cylinder type.

In 1910, there ascended to the presidency and the general managership of the Buick Company, C. W. Nash, who had risen from a bench-hand in the old Durant-Dort Carriage Works.

In 1918, at the close of World War I, Walter P. Chrysler, who had succeeded C. W. Nash (resigned), left the company and was succeeded by Harry H. Bassett, who came from the Remington Arms Company.

Harry Bassett was President of the Buick Company from 1919 until the time of his death, in Paris, in 1926.

E. T. Strong, who had been General Sales Manager of Buick, became President in 1926 upon the death of Bassett.

I. J. Reuter succeeded Strong, as President, in 1923, but resigned in October 1933.

Harlow H. Curtice succeeded Reuter, as General Manager and eventually as President of Buick.

CHAPTER 7

The Cadillac Is Born; Backed by Venture Capital

The Cadillac Motor Car had its birth in one of the first automobile companies to be organized—the Detroit Automobile Company, established in 1899. Among the incorporators were: Frank J. Hecker, Wm. C. Maybury, Frank W. Eddy, Wm. C. McMillan, Fred S. Osborn, Clarence A. Black, Patrick A. Duey, Albert A. McMillan, Safford S. DeLano, Frank R. Alderman, and Henry Ford.

Alderman was the promoter of the company which was to build a car from designs of Henry Ford. Ten thousand dollars was paid in, with which (according to the record) they expected to build ten cars. The money was gone before one unit was completed.

Henry M. Leland had organized the Leland-Falconer-Machine Company to build engines. His concern got the new contract. After $86,000 had been spent, Ford resigned and was paid $1800 for a patent on a carbureter.

After trying other engineers, Alanson A. Brush was engaged, and the company reorganized. Wm. H. Murphy named it the Cadillac Motor Car Company.

William E. Metzger, who had a retail bicycle store on Woodward Avenue and the Winton car agency, was appointed sales manager of the new company. Metzger entered one of the first cars in the New York Automobile Show in January 1901. Bill (as he was known to everybody), did such a swell job that he disposed of over 2,000 cars at that show, taking a deposit of ten dollars on each sale. That method raised a nice little nest egg for

the new company in the tight going of the early days. These orders were all filled.

Later on Henry M. Leland became president of Cadillac Motor Car Company and his son, Wilfred Leland, vice president and treasurer.

Visions of consolidation were stirring in the minds of several motor car men even in those early days. Benjamin Briscoe secured an option on 60 per cent of the Cadillac stock, at $150 per share. W. C. Durant was busy with a consolidation that was quickly to become known as General Motors Company. Durant had his eye on Cadillac, also. Briscoe's option expired and Durant lost no time in topping the previous offer, and in July 1909, took possession of the company.

After Durant secured control of Cadillac, there arose considerable differencees of opinion between Henry M. Leland and Durant on matters of policy and production. Mr. Leland resigned and organized the Lincoln Motor Car Company. His fine reputation for ability and integrity was evidenced when the subscription books were opened for purchase of stock of the new company. The issue was greatly over-subscribed and there was premium bidding for shares already subscribed and not yet issued.

CHICAGO RIOT HELPS DETROIT

The Cadillac car is known the world over and much of the splendid position it holds today can undoubtedly be credited to Henry M. Leland. A sturdy New Englander of the Brown & Sharpe school, Mr. Leland's attention was quickly attracted to the possibilities of the industry. He made a trip west to survey the situation, with an idea that Chicago might be the place to establish a plant. I believe Detroit was fortunate that on the day he arrived in Chicago, the Haymarket riot was taking place. Chicago anarchists had taken matters in their own hands for the moment, resulting in the kill-

ing of a number of persons and great destruction of property, all of which convinced Henry Leland that it might not be a good place to establish a business.

He stopped off in Detroit on his way back East—and the rest is history. He left his imprint in the very beginning in establishing fine standard machine shop practice. Each automobile made in the early days was a unit of individual hand-made parts. Leland's theory was that a thousand parts could be made precisely like the first one by proper study of gauges, tools, and fixtures. He demonstrated this theory nicely in the early days of the single cylinder Cadillac runabout by sending six cars to London for a demonstration before the Technical Committee of Engineers of the London Automobile Club, an authoritative group. Mr. Leland took with him half a dozen mechanics. They tore down and scrambled parts of the engines, transmissions, axles, and all other parts of the six cars. Then they reassembled from the piles of parts, six complete cars.

The cars were then taken out to the Brooklands track and demonstrated. Again the cars were disassembled and micrometer and gauge measurements taken. The whole demonstration was completely astounding to witnesses. It also made a great impression upon the trade generally, both here and abroad. Incidentally, it was a considerable advertisement for the Cadillac car. Leland twice won the Dewar Cup for this achievement.

The Timken Company received one of the first orders for axles for Cadillac cars. I frequently visited the Cadillac office which was, at that time, in Detroit, on Cass Avenue at the viaduct. On one of my visits, I took a seat outside the door leading into Mr. Leland's office. He was occupied with an official of a prominent brass grease-cup manufacturing company in the East. In those days, many grease cups were used in car construction, particularly in axles and other parts where grease had

to be forced into the bearings and moving parts. All of this is done today by forced feed lubricating systems.

The door was slightly ajar, and Mr. Leland's desk was not five feet from my chair. I couldn't help but see and hear the proceedings and talk. The grease cup manufacturer was asking why, with all his experience and large facilities, he found it difficult to get business from Cadillac. It seems that he had filled an initial order, had received no further business, so had come to Detroit to seek the reason.

A LESSON IN GREASE CUPS

Mr. Leland took two sheets of writing paper, laid them on his desk, marked the word "Go" on one and "Out" on the other. He then called in a messenger boy, asked him to put his two hands together and cup them. Then he said, "Billy, do you know where the small parts stockroom is? And do you know Joe, down there?" The boy said he did. "You go down to Joe and in the row of bins marked D, tell Joe to fill your little hands with as many as you can carry of the 'O' and 'OO' grease cups and bring them to me."

I was interested by this time. The talk went on, generally, until the boy came back, gingerly carrying the grease cups. The old gentleman laid them down, took a thread gauge out of a drawer in his desk, and said, "Now, we will try this gauge on all these cups you made, and all the cups that take the gauge easily, we will mark 'Go.' Those that don't, we will put on the other sheet."

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When I went in, I told Mr. Leland that I could not help but see and hear what had occurred. I said, "I have been saving my money for a new motor car and was undecided what car I would buy. I want you now to put me down for one of your new small 4-cylinder Cadillacs. I know that any car builder who gives as much attention to the grease cups as has just been revealed to me here, certainly gives the same careful scrutiny to the engine, transmission, and all other working parts. I also know what fine limits are held in making your axles, all of which should combine to make a sturdy and satisfactory car."

Henry M. Leland, with his genius for fine production methods and his humanitarian ideals, was the kind of citizen who leaves any community better off for his having been there.

CHAPTER 6

Inventive Genius of Dave Buick Made Many Fortunes

David Dunbar Buick was a paradox—a more or less practical dreamer. By all the laws of averages, he should have made a dozen fabulous fortunes for himself. He did make half a hundred fortunes for other and lesser men. He died broke.

Newspapers seem to revel in the riches-to-rags motif as well as the rags-to-riches theme. During his career, David Buick furnished several headlines, most of which were to the effect that he had once been a millionaire and was broke. He seemed to have the "dark talent"; which is to say that he had the ability to make money, but he had no success in keeping it. He cared little for money, his whole life being engrossed with ideas. He left the motor car business quite a rich man. His later investments were not successful.

He was an inventor with remarkable versatility. In addition to his contribution in the automobile field, he gave more than his share to American good living. Of course, his name will always be associated with the car which bears his name. His lesser known and more prosaic contribution, however, was the enameled bathtub. He had invented a lawn sprinkler while he was a very young man, and during the years that followed he secured patents on a number of valves, tanks, and other gadgets having to do with indoor toilets. That does not sound terrifically glamorous but it did make for more comfortable and more sanitary living. A group of German manufacturers had a closely guarded secret. This was a

method of applying enamel to the surface of cast iron bathtubs. Buick invented his own method of doing this highly essential job in America. It was a commercial success and, had he devoted himself to this work, would have probably become one of Detroit's first millionaires. There was some talk of organizing an American syndicate, but Buick failed to follow through.

He had inventive genius but little business sense. Once he had invented a thing, he lost interest.

AN INSPIRING LETTER

There is a wide-spread misapprehension about inventors making big money. With few exceptions—notably Thomas Edison — inventors, as such, have not made enormous fortunes. Buick was no exception. Before I go into Buick's connection with the automobile industry, I want to make an unqualified statement. Would that I could live a life that would elicit a letter such as David Dunbar Buick received in the last days of his life when he was, to all intents and purposes, broke and down-and-out. I believe that I should treasure such a letter above all things and accomplishments. The letter in full follows:

Wayburn, Saskatchewan, Canada
February 5, 1928

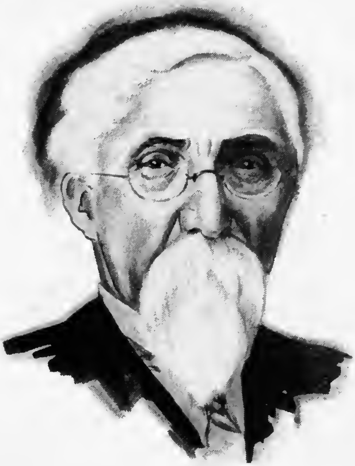
David D. Buick, Esquire
Detroit, Michigan

Dear Sir:

Having read an interview given by you to a newspaper correspondent, I was more than moved to sympathy, if I might put it that way.

I quite understand that a man of your type craves neither charity or sympathy, but I notice in the interview you said you would like security.

DAVID D. BUICK



HENRY M. LELAND

EUGENE W. LEWIS

HERBERT W. ALDEN

. . . MADE OUR FREE ENTERPRISE . . .

A great inventor, a master precision craftsman, the Author as a young man and his friend and former business associate.

WILLIAM C. DURANT

HENRY FORD

JOHN M. STUDEBAKER

J. W. PACKARD

. . . THE GOAL OF NATIONS . . .

Cars these famous men made circled the Globe.

Now, I am a stationary engineer holding a fairly good position with the Saskatchewan Government. I am married, but have no children and would like to say to you from the bottom of my heart that I will offer you a home and my care at any time you feel that you would like to quit your present vocation and take things easier.

If you get incapacitated or out of funds please let me know, and I will do my best, in fact my utmost, for you and will send you enough money at any time to get you to my home, which shall be your home as long as you wish it. Please don't think this is the kind of charity you don't like to accept, as I would only think it my duty even as a stranger who has never met you. Merit is not rewarded as it should be very often. It is one of the unfortunate things of life that the one most deserving very often gets the least acknowledgment.

If I can impress on you that my invitation and wishes for your future are sincere, I shall be glad to do anything I possibly can for you at any time.

Hoping you will pardon me for writing to you on account of being a stranger, but I felt that at least if I could give you any security for your future, I should be doing a little at least to repay for the merit due you which has not been recognized.

Yours very sincerely

(Signed) Gordon E. Mann

The milk of human kindness still flows, as demonstrated by the above letter. In its gentle humaneness, in its respectful offer of assistance to a gentleman of genius to

whom the world and circumstances had not been too kind is embodied the spirit of the brotherhood of man. If the world would follow the example of kindly, friendly, gentle, understanding Gordon E. Mann, it would be filled with Men of Good Will—and would have little reason to be terrorized at the thought of the Atomic Bomb—or anything the future may hold.

This letter was received one year, to the day, before Buick died.

BUGGY MEN BECOME CAR BUILDERS

The Buick had its beginnings way back in the very early days of motor vehicle experiments.

David D. Buick was associated with the Sherwood Brass Company, then known as Buick & Sherwood. He had produced a number of inventions which brought in sufficient income to supply funds for constructing many of the mechanical gadgets and devices that flowed from his active, inventive brain. In 1901, he sold his interest in Buick & Sherwood, and some of his patents, for $100,000. With this capital he was free to spend his time and money actually producing the things of which he dreamed.

He continued his work and experiments in the rear of his home on Meldrum Avenue, Detroit, assisted by his son, Tom. In three years he saw his capital fade away. For this expenditure of time and money, he had a valve-in-head motor plant and an engine that worked, and a new style of "buggy" to carry it and to be propelled by it.

He advertised in the Detroit papers for a partner and fresh capital. Among the letters that came in was one from J. H. Whiting, a Flint banker and carriage manufacturer. To demonstrate that he had something, Dave finally succeeded in driving his car to Flint, completing the required demonstration. Whiting put up $35,000. A company was organized with Buick holding

the majority of the stock. This operation was conducted in a small building across from the Flint Wagon Works plant.

The Flint men, all executives of the Flint Wagon Works, were: J. H. Whiting, W. S. Ballenger, C. M. Begole, Charles A. Cummings, William Beacraft, Walter Marr and William Wascher.

The first complete Buick car was sold about July 1, 1904, to Dr. H. H. Hills, of Flint. Nearly two months were consumed in manufacturing it, as the prospective purchaser looked on impatiently. The doctor used this car for four years before selling it.

One Sunday, Dr. Hills took W. C. Durant and Mrs. Durant for a ride. Mr. Durant was very much impressed with the demonstration and the well-known Durant imagination and vision could see great possibilities in the car. That same year, Durant purchased control of the company and a little later moved it to Jackson where larger quarters were available. The company enjoyed a fairly successful operation in Jackson but it was found desirable to move the plant back to Flint.

FLINT BECOMES MOTOR CONSCIOUS

Business men placed their fortunes at the disposal of Durant and the Buick Company. Laborers, clerks and others mortgaged their homes to buy stock in the enterprise. Soon construction of buildings was started and Flint's transformation from the Vehicle City, as it had become known, through the manufacture of carriages and road carts, to a motor city, had begun. The 2-cylinder design, under the impetus of more business and additional experience, was soon changed to the 4-cylinder type.

In 1910, there ascended to the presidency and the general managership of the Buick Company, C. W. Nash, who had risen from a bench-hand in the old Durant-Dort Carriage Works.

In 1918, at the close of World War I, Walter P. Chrysler, who had succeeded C. W. Nash (resigned), left the company and was succeeded by Harry H. Bassett, who came from the Remington Arms Company.

Harry Bassett was President of the Buick Company from 1919 until the time of his death, in Paris, in 1926.

E. T. Strong, who had been General Sales Manager of Buick, became President in 1926 upon the death of Bassett.

I. J. Reuter succeeded Strong, as President, in 1923, but resigned in October 1933.

Harlow H. Curtice succeeded Reuter, as General Manager and eventually as President of Buick.

CHAPTER 7

The Cadillac Is Born; Backed by Venture Capital

The Cadillac Motor Car had its birth in one of the first automobile companies to be organized—the Detroit Automobile Company, established in 1899. Among the incorporators were: Frank J. Hecker, Wm. C. Maybury, Frank W. Eddy, Wm. C. McMillan, Fred S. Osborn, Clarence A. Black, Patrick A. Duey, Albert A. McMillan, Safford S. DeLano, Frank R. Alderman, and Henry Ford.

Alderman was the promoter of the company which was to build a car from designs of Henry Ford. Ten thousand dollars was paid in, with which (according to the record) they expected to build ten cars. The money was gone before one unit was completed.

Henry M. Leland had organized the Leland-Falconer-Machine Company to build engines. His concern got the new contract. After $86,000 had been spent, Ford resigned and was paid $1800 for a patent on a carbureter.

After trying other engineers, Alanson A. Brush was engaged, and the company reorganized. Wm. H. Murphy named it the Cadillac Motor Car Company.

William E. Metzger, who had a retail bicycle store on Woodward Avenue and the Winton car agency, was appointed sales manager of the new company. Metzger entered one of the first cars in the New York Automobile Show in January 1901. Bill (as he was known to everybody), did such a swell job that he disposed of over 2,000 cars at that show, taking a deposit of ten dollars on each sale. That method raised a nice little nest egg for

the new company in the tight going of the early days. These orders were all filled.

Later on Henry M. Leland became president of Cadillac Motor Car Company and his son, Wilfred Leland, vice president and treasurer.

Visions of consolidation were stirring in the minds of several motor car men even in those early days. Benjamin Briscoe secured an option on 60 per cent of the Cadillac stock, at $150 per share. W. C. Durant was busy with a consolidation that was quickly to become known as General Motors Company. Durant had his eye on Cadillac, also. Briscoe's option expired and Durant lost no time in topping the previous offer, and in July 1909, took possession of the company.

After Durant secured control of Cadillac, there arose considerable differencees of opinion between Henry M. Leland and Durant on matters of policy and production. Mr. Leland resigned and organized the Lincoln Motor Car Company. His fine reputation for ability and integrity was evidenced when the subscription books were opened for purchase of stock of the new company. The issue was greatly over-subscribed and there was premium bidding for shares already subscribed and not yet issued.

CHICAGO RIOT HELPS DETROIT

The Cadillac car is known the world over and much of the splendid position it holds today can undoubtedly be credited to Henry M. Leland. A sturdy New Englander of the Brown & Sharpe school, Mr. Leland's attention was quickly attracted to the possibilities of the industry. He made a trip west to survey the situation, with an idea that Chicago might be the place to establish a plant. I believe Detroit was fortunate that on the day he arrived in Chicago, the Haymarket riot was taking place. Chicago anarchists had taken matters in their own hands for the moment, resulting in the kill-

ing of a number of persons and great destruction of property, all of which convinced Henry Leland that it might not be a good place to establish a business.

He stopped off in Detroit on his way back East—and the rest is history. He left his imprint in the very beginning in establishing fine standard machine shop practice. Each automobile made in the early days was a unit of individual hand-made parts. Leland's theory was that a thousand parts could be made precisely like the first one by proper study of gauges, tools, and fixtures. He demonstrated this theory nicely in the early days of the single cylinder Cadillac runabout by sending six cars to London for a demonstration before the Technical Committee of Engineers of the London Automobile Club, an authoritative group. Mr. Leland took with him half a dozen mechanics. They tore down and scrambled parts of the engines, transmissions, axles, and all other parts of the six cars. Then they reassembled from the piles of parts, six complete cars.

The cars were then taken out to the Brooklands track and demonstrated. Again the cars were disassembled and micrometer and gauge measurements taken. The whole demonstration was completely astounding to witnesses. It also made a great impression upon the trade generally, both here and abroad. Incidentally, it was a considerable advertisement for the Cadillac car. Leland twice won the Dewar Cup for this achievement.

The Timken Company received one of the first orders for axles for Cadillac cars. I frequently visited the Cadillac office which was, at that time, in Detroit, on Cass Avenue at the viaduct. On one of my visits, I took a seat outside the door leading into Mr. Leland's office. He was occupied with an official of a prominent brass grease-cup manufacturing company in the East. In those days, many grease cups were used in car construction, particularly in axles and other parts where grease had

to be forced into the bearings and moving parts. All of this is done today by forced feed lubricating systems.

The door was slightly ajar, and Mr. Leland's desk was not five feet from my chair. I couldn't help but see and hear the proceedings and talk. The grease cup manufacturer was asking why, with all his experience and large facilities, he found it difficult to get business from Cadillac. It seems that he had filled an initial order, had received no further business, so had come to Detroit to seek the reason.

A LESSON IN GREASE CUPS

Mr. Leland took two sheets of writing paper, laid them on his desk, marked the word "Go" on one and "Out" on the other. He then called in a messenger boy, asked him to put his two hands together and cup them. Then he said, "Billy, do you know where the small parts stockroom is? And do you know Joe, down there?" The boy said he did. "You go down to Joe and in the row of bins marked D, tell Joe to fill your little hands with as many as you can carry of the 'O' and 'OO' grease cups and bring them to me."

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1927–3,083,360; 1928–4,012,158; 1929–4,794,898. This was exclusive of trucks.

The Chrysler production added materially to the national figures.

In 1928, the Chrysler output amounted to 360,000 cars. That was an eventful year for the Chrysler Company. It not only registered a tremendous expansion in the three models, De Soto, Plymouth and Chrysler, but was also the year in which Walter Chrysler achieved his greatest personal triumph in the acquisition of the Dodge Brothers Company from Dillon, Reed & Company, New York bankers.

THE FABULOUS DODGE BROTHERS

The Dodge brothers' story, in and of itself, is another one of those dramatic chapters in motordom, of which much has been written. John and Horace Dodge operated a machine shop and got their introduction to the automobile business by manufacturing motors and transmissions for Henry Ford. The time came when they were offered and accepted 100 shares of the newly organized Ford Motor Company, par value $10,000, for which they paid in machine work.

Many hold the belief that the good machine work done by the efficient Dodge brothers, in the early Ford cars, was largely responsible for firmly establishing that car in the public favor. They both had considerable experience in the 1890's in producing bicycle parts, in which fine limits were observed.

The Evans-Dodge Company of Windsor, Ontario, was absorbed by the National Cycle and Automobile Company, of Hamilton, Ontario. At the same time the same concern bought the E. C. Stearns Company, of Toronto. Frederick J. Haynes, Superintendent of that plant, went with the sale. Haynes was with the Dodges for years, except for a period in which he was manager of the H. H.

Franklin Company of Syracuse, New York, which produced the Franklin air-cooled car. At one time, Haynes was offered a job with Ford but declined the offer. When the Dodge Company again sent for Haynes several years later, he became factory manager. Haynes was made President of the Company when the Dodge brothers died in 1920. Later he became Chairman of the Board and retained that position until Chrysler bought the business.

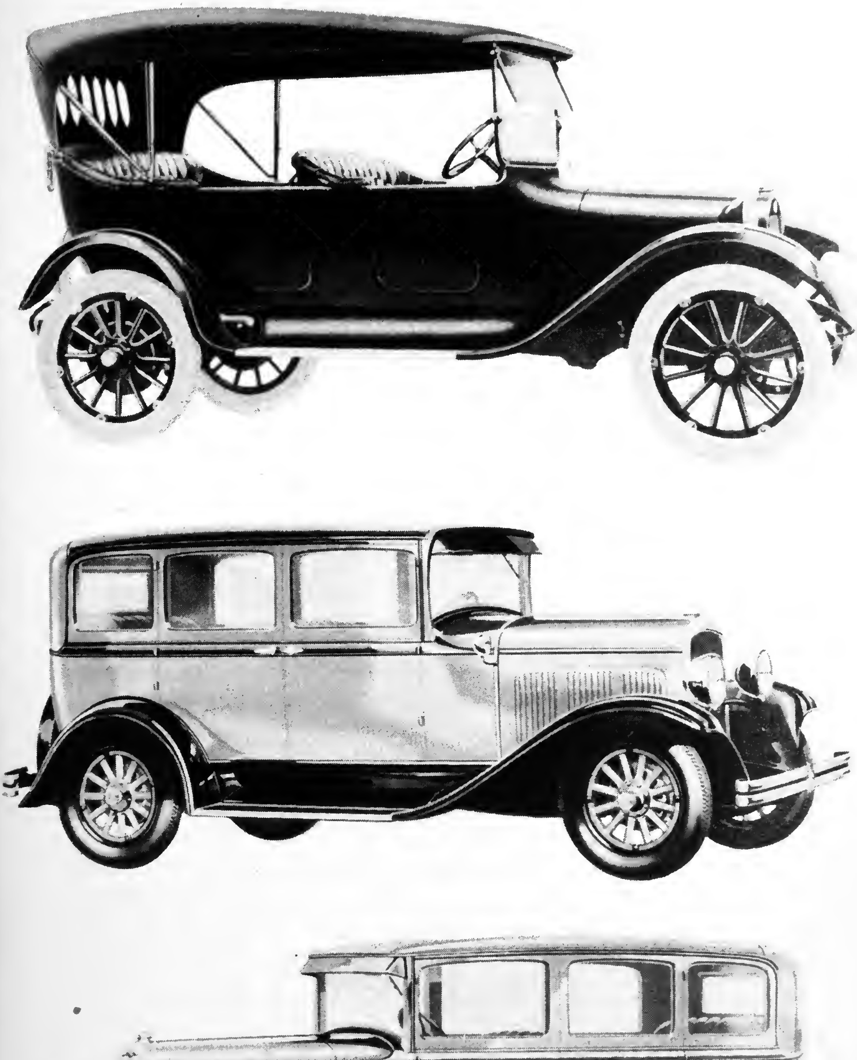
The hundred shares of stock the Dodge Brothers held in the Ford Motor Company were purchased in 1919 by Henry Ford for $25,000,000. In addition, the Dodges had received nearly $10,000,000 in dividends, and had made considerable profit in the machine work they had done for the Ford Company.

DODGE BROTHERS AMONG THE GREAT

It was in 1913 that the brothers decided to make a car bearing their own name, and this car quickly met public approval, containing numerous features not included in contemporary cars. The Dodges established a principle of improving cars during the year, and not waiting until the end of the calendar year—the time the new models were usually introduced.

They pioneered the first all-steel bodies in 1914. There were but six years of successful operation of the Dodge Brothers Corporation under the leadership of the dynamic Horace and John Dodge until the untimely death of both brothers came close together in 1920.

John and Horace Dodge were outstanding personalities in the automobile industry. Aside from the fabulous stories and legends which grew around them, illustrating their gargantuan propensities for both work and play, and which need no repeating here, their prestige as leaders and builders has not been equalled. They were the modern Damon and Pythias. Theirs was more than a fondness for each other. There is little question among



THREE FIRSTS

A 1914 Dodge (top); 1928 De Soto (center), and 1928 Plymouth.

their close friends that Horace died of grief following his brother's death. The brothers were inseparable.

Horace was fond of music and was one of the most liberal supporters of The Detroit Symphony Orchestra. They tell a story of him hurrying back from an "up north" hunting trip to attend an opening of the Symphony, not occupying his box, but taking a seat in the balcony, still wearing his hunting clothes. He heard the concert, and immediately left and returned to the North Woods. The Detroit Symphony Orchestra honored him by playing at the wedding of his daughter, Delphine, and at the wedding reception at the Dodge Lake Shore residence in Grosse Pointe.

THE DODGES WIN A SUIT

John's quick decisions and acceptance of big untried contracts with their unknown possibilities, were well known and probably well understood when, in the beginning of World War I, the government was desperate for recoil mechanisms to be used by great field guns. It wanted fifty a day. Other manufacturers had suggested that ten or fifteen a day could be produced. The Dodges asked many questions, studied blueprints. John, with a characteristic jerk of the head, and projecting jaw, said, "Fifty, hell! We will make a hundred a day for you." The Washington people were completely sceptical. Asked when the Dodges could start on the guns, John told them by the middle of March—only four months away. How they built a large plant 600 x 800 feet, equipped and in production within that period, completely baffled observers. The Dodges were again doing the impossible. The brothers were on the job day and night and the first week of March Washington was notified that they were ready to go.

Their dramatic suit against Ford to compel him to pay dividends against accumulated earnings was a case

of flint striking flint. The Dodges finally won the litigation and, in December 1917, a decision was rendered ordering Ford to pay them some $29,000,000, less all dividends accumulated during the time of the suit—which left approximately $19,000,000 to be distributed as a special dividend.

Frederick J. Haynes continued to operate the business, attempting to carry out the policies and practices of the Dodges. The brothers' homely principle of honesty in construction of their car had been amply rewarded by public confidence and purchases.

Changing business conditions had resulted in diminishing the interest of the widows of John and Horace Dodge, sentimental and otherwise, in the holdings of the brothers. In 1924, the Dodge interests decided to sell and various propositions were received. General Motors bid $134,000,000, and Dillon, Read and Company, of New York, bid $152,000,000 cash, minus dividends since the first of the year. The Dillon, Read offer was accepted, and the Dodge estates received a check for $146,000,000.

The Graham brothers were put in charge of the business by the new financial ownership. These brothers had been netting about eight million dollars a year making the Graham truck. In a few months' time, the Dodge property, under the new management, recorded one of the most spectacular recoveries in automotive history.

Dillon, Read, had an option for one year on the Graham Brothers Truck Company, and when this was exercised it passed into the hands of the Dodge owners. Edward G. Wilmer, who had just reorganized the Goodyear Rubber Company, succeeded the Graham brothers in management.

In 1923 Walter Chrysler made a prediction: "The day will come when Chrysler will usurp the position of the Dodge Brothers." That day came.

Clarence Dillon approached Chrysler in June 1928,

offering to sell, but Chrysler, being a shrewd trader, played hard to get. Chrysler was anxious to acquire the property, but feigned indifference, and stalled negotiations over a long period. Finally, he demanded that 90 per cent of the stockholders must consent to the sale, forcing Dillon, Read into the open market to accomplish that purpose.

K. T. Keller sat at the end of an open telephone wire between Detroit and New York for a full hour before B. E. Hutchinson gave him the news that the Dodge Brothers' deal had been closed. Late that afternoon, all the paraphernalia of management, including signs, printing and so forth, were en route to the Dodge plant. The next morning the plant opened—completely under Chrysler management.

Chrysler was reputed to have paid $70,000,000 in new Chrysler stock and to have assumed the Dodge debentures. Included in the sale price was a huge sum for "good will" and the use of the Dodge name. The new organization was under the management of K. T. Keller.

The Chrysler Corporation now had the field well covered as to price and models of cars and trucks. The Dodge business materially strengthened the Chrysler position.

The Chrysler Corporation is an operating company in every sense of the word. It has expanded rapidly, but consistently, and now has plants scattered over the United States and Canada, with a subsidiary manufacturing air conditioning and heating equipment, industrial and marine engines, oilité bearings and other products. It was a major manufacturer of war materals, both for the Army and Navy, in World War II.

The Chrysler Corporation was one of the mainstays of the government during the war. It produced various types of trucks and vehicles, tanks, shells, bomber parts, and other equipment. Its engineering department, under the Three Musketeers, has been responsible for intro-

ducing numerous engineering innovations and practices.

Walter Chrysler was a giant in the automobile industry during his active years. He was a rare combination of manufacturer, salesman, financier, and an all-around sound businessman. Coupled with these qualifications was an unusual ability in selecting associates. When he died in August 1940, he left a well-balanced and successful organization, which makes the Chrysler Corporation one of the most competitive in the field today.

Chrysler's quick rise proves Emerson's classic: "An institution is but the elongated shadow of one man." The men Chrysler selected have given ample evidence of their capacity and ability to project the shadow of Walter Chrysler and his policies far into the future.

STRONG LINKS IN CHRYSLER CHAIN

The Chrysler operation, with its very varied products and its multiple problems, has been broken up into operating units easily administered and executed by capable men. Here are the links that made the strong Chrysler chain: K. T. Keller, B. E. Hutchinson, F. M. Zeder, J. E. Fields (who retired in 1943), Carl Breer, Owen Skelton, H. L. Weckler, W. L. Mitchell, A Vanderzee, Byron C. Foy, Dan S. Eddins, L. G. Peed, I. T. O'Brien, H. A. Davies, C. E. Bleicher, D. A. Wallace and others.

* * *

For two years before his death, Walter Chrysler was inactive, giving the machine, which he had set up, an opportunity to prove itself in operation. It did just that —and to a superlative degree—being sparked by dynamic K. T. Keller, who is now the versatile and capable president of the Chrysler Corporation. "K. T.", as he is affectionately known, began with the Westinghouse Machinery Company. He gained varied experience with the Metal Products Company, Hudson Motor, Northway Motor, and then began his more extensive executive work

with the Cole Motor Company, of Indianapolis. From there he went to General Motors, Buick Division, and finally was placed in charge of all manufacturing activities of Chevrolet, where he became vice president and general manager of General Motors of Canada, Ltd.

"K. T." joined Chrysler in 1926, and immediately production mounted. Chrysler had watched Keller's progress for several years and knew his capacity and ability. "K. T." was made the company's dynamic production manager.

* * *

B. E. Hutchinson, vice president and chairman of the finance committee, graduated from Massachusetts Institute of Technology. He began his career as a newspaperman on the Boston *Globe*.

"Hutch's" great executive ability and his financial genius have played a most important part in the development and growth of the Chrysler Corporation and its subsidiaries. He has been and still is identified in executive capacities with its various corporations. His dynamic leadership has always brought increased sales with corresponding soundness in the affairs of the corporation's several divisions. I believe that Hutch's host of friends will agree with me that this brief recital very inadequately measures his stature and does not begin to reflect his capacity and ability or his tremendous influence upon the automobile industry.

* * *

Within the page limits of one book, unless that book be a tome of box car dimensions, it would be utterly impossible to comment completely on the achievements of the multitude of outstanding men in the Industry. However, just here I want to emphasize the influence on the industry of the prodigious work and accomplishments of Fred Zeder—and especially the heroic services he and a group of scientific and engineering associates performed

during the trying war period of the last World War.

Fred began his education in Bay City and graduated from the University of Michigan in 1909. His first recognition came while he was manager of agricultural implements department at Allis-Chalmers. It was there that he met Carl Breer who had come to that concern from Stanford University as a scholarship student.

Zeder first met Walter Chrysler in 1911. He was the first technical man to join the Chrysler organization. At that time, there was little laboratory work done in the industry and "analysis" was simply and purely a word. Zeder set up his first "complete" laboratory at Studebaker about 1913. This was a highly efficient technical engineering organization. Owen Skelton, one of the automotive "musketeers," joined Zeder for the enormous wage of fifty-eight cents an hour and Breer for $200 a month. Zeder and his associates designed and built three cars—a four, a light six and a big six—with improvements and innovations which advanced the industry tremendously. The cars were tested at Saranac Lake, New York, with financiers present. A chapter could be written about the results of the Saranac tests. These tests opened the minds of several groups of auto builders of that day.

Zeder's greatest contribution has been the formation of a highly competent and thoroughly complete technical group of engineers, chemists and metallurgists which form every unit necessary to a modern scientific laboratory. The loyalty and unity of purpose of this group have been of invaluable benefit to the industry. It has been said of Zeder and his associates that their efficiency as engineers and laboratory technicians has at times made it possible for them to out-engineer the great mass productive capacity of the industry—particularly in its early stages.

* * *

Carl Breer, one of the famous Three Musketeers, began building automobiles when he was 17 years old. He

was a Californian and was fascinated by the new fangled horseless carriage. On the theory that the best way to know things was to make them, he proceeded to build a steam car. The car was finished and running in the fall of 1900. Carl designed the engine himself, made his own patterns, and helped the foundrymen make some of the castings. He machined all the parts of the engine on a foot-power lathe, and made the burners and all the regulating devices. He made a Bunsen type of burner of cast iron and, as his hand-operated drill press could not get up enough speed to make the small-sized holes to allow the gas to come through, he used a water wheel drill press to get the desired high speed. He bought the boiler and had the chassis frame made outside.

Licenses were required to operate cars, then as now, but the state had no license plates. Carl made his own and chose the famous steam locomotive number 666.

During the two years after his first demonstration he added extra features, such as steam pumps, direct-acting water feed on one side of the engine, and automatic air pump on the opposite side, and other gadgets.

He made the little knurled hand wheels out of gears taken from water meters, besides building all the control levers, water-level gauges, and so forth.

This car is on exhibition in the Chrysler showroom in its main Detroit office. Carl still takes justifiable pride in showing it.

* * *

Owen R. Skelton, the other member of the Three Musketeers combination that stood shoulder to shoulder for nearly two decades with Walter Chrysler in a one-for-all and all-for-one engineering group, completed a modern picture of D'Artagnan and the three musketeers. At their small consulting engineering plant in Newark, New Jersey, they had each brought to bear a particular angle of motor car engineering, which, in later years, made them an outstanding combination in balanced, progres-

sive car design.

One of their early jobs as a firm was given them by Durant—the revamping of an engine which was later used in one of his cars.

It was inevitable with their record that they should join Chrysler in Detroit to combine their skill and visions with his, to build a dream car. The rest is history.

* * *

Herman L. Weckler, Vice President and General Manager of Chrysler Corporation, coordinates and directs the production of all Chrysler, De Soto, Dodge and Plymouth passenger cars and trucks and the operation of all Chrysler Corporation plants.

Weckler has been connected with the automobile industry for 36 years and is recognized as a "master producer" of motor cars and the facilities for building them.

Herman L. Weckler has been associated with Chrysler since 1932, as an assistant to K. T. Keller. He resigned as works manager at Buick to join Keller.

In 1936, Weckler was commissioned to lay out and build the new plant for the De Soto Corporation. Later, he was made vice president and general manager of De Soto and still later became head of industrial relations of the Chrysler Corporation. This was in 1937. He next rose to vice president and general manager of the organization, and in 1940, he was elected to the board of directors.

* * *

H. A. Davies, who watches the finances of the Chrysler Corporation, began in 1911 as an accountant with Ben Briscoe's United States Motor Corporation. Incidentally, Briscoe's organization promised at one time to become a strong competitor of General Motors.

After receivership of U. S. Motors, Davies came to Detroit with the Maxwell Motor Company, Incorporated.

Walter Flanders was president with Ledyard Mitchell as his assistant. Mitchell succeeded Flanders as president and subsequently became vice president of Chrysler. Davies continued his progress through various positions to that of treasurer of the parent Chrysler Corporation, which position he holds today.

* * *

DAVID A. WALLACE is now President of Chrysler Division, of Chrysler Corporation.

Wallace is a Westerner, as was Walter Chrysler. Also, like Chrysler, he was an experienced railroader. He received his education in the Highland Park College of Engineering in Des Moines, Iowa.

In 1908, he got his first motor car mechanical experience with the old Oakland two-cylinder car, working in Wichita, Kansas, and was later a part of the Buick Service Division in San Antonio, Texas.

He had extensive experience with the Corrigan and McKinney Company in Texas, as master mechanic, laying out projects, power plants and lines, in connection with the company's large smelting and mining operations. He was also associated with William Little, in Flint, in producing Buick cars.

He was in war work in 1915, as general manager of a plant in Iowa, making shells. He served in the Army during World War I. In 1919, he joined John Deere Plow Company in Moline, Illinois, and remained with that organization until K. T. Keller brought him to Detroit as a member of Keller's staff. Later, he became vice president in charge of manufacturing and took over the sales division of Chrysler Division when Joseph E. Fields was moved up. In 1937, he was made president of the Division.

David Wallace is still the Westerner, still nostalgic for the open spaces. He owns thousands of acres of ranch land and is an extensive breeder of thoroughbred cattle. He is

still enthusiastic about motors and machinery, but it is a safe bet that someday the ranch will call him.

* * *

I. T. O'Brien, another key man in the Chrysler organization, was originally with the Weston-Mott Axle Company, of Flint. He transferred to the Buick Company when Walter Chrysler was its head. After Chrysler left General Motors for the Willys job, O'Brien was sent to the Elizabeth, New Jersey, plant to supervise and plan production.

Following the depression in 1921, he came to Detroit to handle production of the Maxwell Company, which had taken over the Chalmers plant, on a lease.

O'Brien now occupies the position of assistant general manager of Chrysler, as a direct assistant to Weckler.

* * *

Byron C. Foy was a salesman for the Ford Motor Company in Dallas, Baltimore and Boston from 1916 to 1918. He was President of Reo Motor Car Company of Los Angeles from 1921 to 1925. From 1925 to 1927, he was Vice President of J. H. Thompson Company, Chrysler distributors in Detroit.

He became vice president of Simons, Stewart, and Foy, Chrysler distributors in New York, in 1927, and remained in this position until 1929. Foy has been Vice President of the Chrysler Corporation since 1929, and in 1931 was made President of the De Soto Motor Corporation.

After his discharge from the Armed Services, Foy took up the duties as Vice President of Chrysler Corporation, in the New York office, until he resigned in 1946 to become Chairman of the Board of Jack and Heintz, Precision Industries, Inc. C. E. Bleicher, assumed the presidency of De Soto Corporation at that time, succeeding Foy.

The automobile experience of Dan Eddins began in Texas in 1908 as agent for the Garford Car, then distributed by Studebaker. Dan has remained in the automobile business ever since, progressing through various positions of responsibility with General Motors Corporation over a period of a dozen years, or more.

Dan Eddins' connection with Chrysler Corporation has been one of continuous advancement which has placed him in the presidency of Plymouth Motor Car Company, one of the strong units of Chrysler Corporation.

* * *

Another one of the Chrysler stalwarts, Charles E. Bleicher, began his career in Dayton, Ohio, with the Stoddard-Dayton Motor Car Company. Later, he joined the group forming the Speedwell Company, in Dayton. Like many others in the automobile business, he worked as tool maker for the National Cash Register Company, of Dayton. He then went to the Carroll Engineering Company and on to the Maxwell Motor Company in 1923, in charge of tooling the new models.

In 1937, Bleicher was made Vice President of the De Soto Motor Corporation. L. G. Peed, President of De Soto, who had advanced to the presidency of that company, from chief tester of the Maxwell Company, resigned in November 1944, because of ill health, and Bleicher was elevated to the presidency of the De Soto Corporation in January 1945.

CHAPTER 10

Ford's Work and Dreams Bring "Freedom" To Millions

When one thinks of Detroit, one thinks immediately of Henry Ford and, while it is not exactly his town in its entirety, he probably did more than any other one man to make it known as a great metropolis. Henry Ford's story is a fairy tale, his life an admixture of naivete and genius. For nearly 50 years he has been and still remains a person in whom the whole world is intensely interested. Probably no other private citizen ever attained equal appeal to the imagination of both the lowly and the great. A glance through newspaper files of the past forty-odd years would show that hardly a day went by without mention of Henry Ford and his activities. During the years immediately preceding and following the first World War, Henry Ford's every word and gesture were news to be played in the headlines of American newspapers and cabled over the world. If Henry Ford casually remarked he liked corned beef and cabbage, that was a news flash for all the wire services. And following the flash, star reporters of great papers interviewed Mr. Ford to find out just how he liked his corned beef and cabbage cooked. If he made even the slightest comment on some political issue or candidate, that was enormous and potent news which stirred political circles into a buzz of contentious discussion.

This prominence—certainly unsought—could have been a source of acute embarrassment to Mr. Ford; and sometimes it must have carried its irritations. Because Henry Ford is essentially a simple man. He is essentially

a simple man who enjoys talking simply with friends. This is not to say that he is a garrulous man, but he likes to talk in a neighborly way, and during the years when each word he uttered went into headlines, it must have been trying to him.

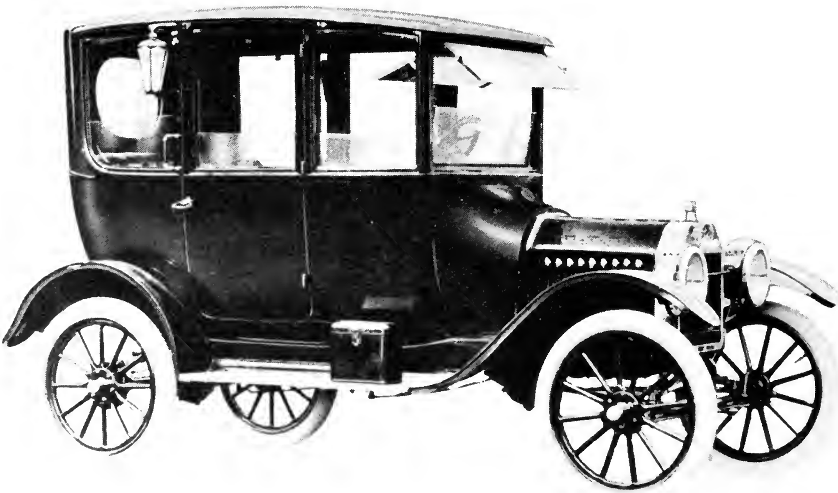
Even now, after Mr. Ford's retirement and the succession of his astute eldest grandson, Henry Ford II, it is impossible to talk five minutes about the automobile industry without the elder Henry's name entering the conversation. In clubs, on trains, in homes, it is always the same. Mention Detroit or the industry and Mr. Ford's name comes in.

I understand that my old friend, William C. Richards, who, during the heyday of the Ford publicity practically lived in Mr. Ford's pocket as a reporter for the Detroit Free Press, is writing an anecdotal life of Mr. Ford. I know of no one who is better qualified to do this monumental work, but I do not envy Richards his task because it will never end. There are literally tens of thousands of Ford stories based upon his hobbies, his words, his actions, his work and his activities—some true, some legend based on truth, and some utterly false. There have been many books written about Mr. Ford. Some of these books were written by sycophants who grew delirious and almost hysterical about Mr. Ford's virtues and achievements. These books, of course, were written for popular sale, the authors knowing full well that the power of the name Ford would guarantee them a reading audience. Other books were bitter, derisive and vindictive, picturing Mr. Ford as a devil and a gold digger, shrouded in a mantle of selfishness and greed. These books likewise were pointed for sales. The writers knew that a certain segment of the public would buy any book viciously written about any man who had grown to heroic stature in the public mind.

During his active years Mr. Ford was neither a saint nor a sinner. His first and his best quality was that he was

A GOLDEN JUBILEE

This old car made its initial run on Detroit streets in 1896. From it emerged the modern Ford. During the Golden Jubilee in 1946, Mr. and Mrs. Henry Ford went for a ride in his first car. Here Mrs. Ford is seen stepping into the car, assisted by her grandson, Henry Ford II, now President of the Ford Motor Company, while Henry I looks on. They all appear a bit apprehensive.



FIRST FORD TWO-DOOR SEDAN

FIFTEEN MILLIONTH FORD

A "Tin Lizzie" (1915); Edsel Ford drives it away.

essentially human with the faults and frailties, the good qualities and some of the other kind that most of us have. He invited criticism by his very honesty and simplicity. He made no pretense of being an educated man in the accepted sense, although even as a young man Henry Ford had a better education in things general than most colleges of his time were able to offer their students. Since his youth he has educated himself—been educated at random, one might say.

Perhaps the fact Mr. Ford was not educated along conventional lines has been to his and to our advantage. One of his qualities—and this certainly is among his best—is that he is and has always been entirely unorthodox. His progress has been marked not only by startling innovations but by his upsetting many orthodox practices and ideas. This, among other things, has made him stand out as a unique and different kind of man.

Henry Ford's record of achievement after reaching middle age clearly proves, in his case at least, that life begins at forty. Simplicity and directness are his cardinal virtues. These still dominate his personal and business life. He remains "overalls-minded" and a workman at heart. Thinking up from the grass roots into sound conclusion is, with him, a well developed art. Money, as money, is unimportant to Mr. Ford. Often, until recently, some watchman in the vast Rouge Plant on his rounds, would come across Ford, a lone, solitary figure working at a machine—a lathe or a drill or a press or a motor. If he told the watchman what he was trying for, it was in confidence, well kept.

Some writers question his sagacity in the decision to organize and confine the Ford company policies to the production of a small, light car for the masses rather than a large, luxurious car for the classes. They take the position that the circumstances and conditions of the times automatically made the decision, overlooking the fact

that at the time he reached it, the whole trend of the industry was in the opposite direction. Second guessing now does not dim the vision he had of the important position the small motor car was to play in the transportation problem of a growing country, and the necessary part it would play in the lives of its people.

Here is a prophecy he made to me just after he had moved from the frame building on Mack Avenue, owned by Albert Strelow, one of his original stockholders, into the larger brick building on Piquette Street. He had a little office over to the left of the entrance with a high, old-fashioned desk and two stools. We perched on those stools, and during the talk he made a prophecy I have always remembered. It is a complete condensed biography of Henry Ford. He was looking dreamily out of the window when he suddenly turned, tapped me on the knee, and said slowly: "I am going to make a motor car that will be *light* and *strong* and *CLEAN* so that women can drive it."

Motor cars up to that time had a fly wheel that threw oil up through the footboards and made driving a messy job.

He continued, "And it will have enough power to do any kind of work called for, and will be sold so any man who can own an average horse and buggy can afford to own a car."

VALUES DOLLARS ONLY AS "WORK UNITS"

I want to emphasize Mr. Ford's complete disregard for money from the very beginning. I don't think he was ever interested in accumulating money. Little incidents I observed in the early days gave good forecast of what Ford's attitude of mind would be through the changes from his small-income days to the time when he became one of the world's richest men, if not the richest, as measured by the world's standard of dollar value. His

idea of wealth has always concerned the ability to create more work and to produce more goods at lowered cost to the consumer. I remember another time at the new little plant on Piquette Street. We had seated ourselves on the same high stools for a visit. Mr. Ford always was, and still is, interested in things new or different, and he was always willing to talk about activities pertaining to the motor car business. I said, "I see by the *Free Press* this morning that the Packard Company has declared a dividend." The Packard Company had just got going. He nodded indifferently and said he hadn't heard of it. Then, as an afterthought, he started going through all the pockets of his coat, vest and trousers. Finally, he fished out one of those tiny memorandum books that tell you what to do in case of drowning, snake-bite and burns, together with maps and population figures. From this miscellany he produced a slip of paper folded many times into almost ribbon form. He carefully unfolded and spread this slip of paper out on the table in front of me with the laconic comment, "Some other people get dividends." It was a check for $10,500, as I remember it, which I believe was the first one of its kind he had received from his own company. It was dated about forty-five days prior to that time. I commented that the bookkeeper must have trouble with his cash accounts if everybody held checks out that long. He replied, "That doesn't interfere with the value of the money, does it? The money is still there—that is just bookkeeping." It has been so, all through his life. Today, despite his affluence, he still thinks the same way—money is the yardstick for measuring value, but no value exists until labor has been performed, and the more labor there is performed, the more value is secured to create greater demand for *all* products of labor.

Henry Ford left his farm in Dearborn when he was 17 and came to Detroit in 1890, took a job in the workshop of

James Flower & Company, machinist, at $2.50 a week. He did odd-time work with McGill, a jeweler who had a shop at Baker and Twentieth Streets. He earned $2 a week for this night work. Board and room cost him $3.50 a week, leaving him a dollar for spending money and incidentals between paydays. The Drydock Engine Company which made steam motors was his next employer. He left that concern to work at the Detroit branch of the Westinghouse Company. Upon reaching the age of twenty-one he returned to the farm at Dearborn. But his interest in machinery and machines never lagged, and at 27 he returned to Detroit to work for the Detroit Electric Company, later to be known as the Detroit Edison Company, as an engineer and machinist at $45 a month.

Through all of these years he had been experimenting with machines of various sorts, and had developed a vague idea of what he wanted to do and of what his life's work would be. He continued his experiments in a small brick shed at the rear of the house he rented on Bagley Avenue where he worked nights and odd times, and in 1893, three years after he had come back to Detroit for the second time, he tested his first car, steam powered.

His actual and practical connection with the automobile industry came in 1899 when the Detroit Automobile Company was formed to exploit a car Ford was building. Backers of the company advanced $10,000 with which ten cars were supposed to be built. Of course, that small amount did not pay for even one car, and after $75,000 had been spent on these experiments, Ford resigned from the company.

In 1901, he formed the Henry Ford Automobile Company, capitalized at $38,000, of which he was credited with $10,000. By that time there were dozens of concerns over the country trying to make steam and electric cars. In 1902, Ford disagreed with his fellow stockholders. He insisted that the company build a low-

priced car. The Henry Ford Automobile Company was dissolved.

What was to be the present Ford Motor Company was organized in 1903. It was capitalized at $150,000, with $100,000 subscribed and fully paid. Of this amount, fifty-one per cent was owned by Ford and A. Y. Malcolmson, a key figure in the organization. There were twelve stockholders in all. The actual cash put in the company was $28,000.

Subscribing for fifty shares each were John F. Dodge, Horace E. Dodge, Albert Strelow, Vernon C. Fry, C. H. Bennett, Horace H. Rackham and John W. Anderson. James Couzens subscribed for twenty-five shares and Charles J. Woodall ten shares. John S. Gray, a banker, put in $10,500 for 105 shares, being the largest cash investor. Charles J. Woodall was the father of Herbert J. Woodall, president of Woodall Industries.

Ford's salary was $3,000 a year, and James Couzens was to receive $2,500.

From the record of the Ford Company's early history, it would appear that Malcolmson was largely responsible for holding the loose financial ends together in those early days. As a financially successful coal dealer, he came to the rescue of the infant company several times when it was much needed. On his personal guarantee, Malcolmson secured the first big contract for motors and parts from Dodge Brothers. He guaranteed other suppliers' accounts in excess of $100,000, and induced John S. Gray, president of the German-American Bank, to make a considerable investment in the company, by agreeing to buy back Gray's share any time within a year.

Both Malcolmson and Couzens, with all their misunderstandings, had a high regard for Ford's mechanical ideas, and on several occasions when differences arose among stockholders, their arguments prevailed. Malcolmson, however, had a difference with Couzens which decided

him to organize a separate automobile company to build an air-cooled car under the name "Aerocar." When Ford discovered this, he immediately began planning to purchase the shares of Malcolmson and other minority stockholders.

Ford bought out Malcolmson in 1906, paying him $175,000. Ford and Couzens bought out Strelow, Bennett, Fry and Woodall, all on the basis of seven for one. The stock was split up between Ford and Couzens. Ford had control of 58½ percent and Couzens 11 per cent. Ford was now free to follow his own engineering and mechanical ideas, and the results are shown in the greatest mechanical empire the world has ever seen.

Some of the high points in Ford's activities that attracted public attention were: his dramatic and persistent defense in the Selden patent suit; his bid for Muscle Shoals which was indorsed by many state governments; his purchase of the Detroit, Toledo and Ironton Railroad and extensive coal holdings; the launching of a huge fleet of modern vessels to carry coal, iron ore and lumber from his large timber and mining purchases in the northern part of this country, and rubber and other materials from South America.

Some thirty small farming communities were made more prosperous when he established parts manufacturing concerns there. All of these were operated by electricity generated by use of local water power.

A NEW PATTERN OF WAGES

In January, 1914, Ford made an announcement to an assembled group of newspapermen which shattered all precedents. It was his Five-Dollars-a-Day wage scale. This news shook the very foundations of the industry—all industry for that matter—and reverberations were heard around the entire world. Beginning on January 12, all employees of the Ford Motor Company down to sweepers

would receive a minimum pay of Five Dollars a Day. There were many manufacturers, not only in the automobile but in every industry, who said Ford was crazy. But here was the beginning of the application of the principle of social justice in industry. This move probably more than anything else that had previously occurred brought about an entirely new pattern of industrial management for all time to come, and paved the way for decent human relationship between management and labor.

By this time the public was convinced that Ford was some kind of a magician. He was everything to everybody. His plant was the Mecca toward which tens of thousands of migratory workers aimed. The Five-Dollars-a-Day wage was felt in every part of the nation, but especially in the South. To ten cents an hour workers from the back country, this was riches, and they flocked to Detroit, which began to gain in population in mighty strides. Today, Detroit's citizenry is to a large extent Southern.

Henry Ford never wanted to be President of the United States but, without his permission, a boom started in 1922, and through 1923 increased in vigor despite Ford's refusal to become a candidate, until it looked as though he might be drafted into that high office in spite of himself.

Probably one of Ford's biggest fights was over a patent, and this fight he waged for the entire automobile industry. In 1879, George P. Selden, a New York patent attorney, applied for a patent that *seemed* to cover any self-propelled vehicle in which gasoline was used. It is said that he got his idea after viewing the automobile gas engine which was exhibited at the Centennial Exposition in Philadelphia in 1876. Anyway, he contacted the United States Patent Office in 1879 and convinced them that his contrivance, made up of a few working parts, could move under its own power. He did not, however,

take out his patent at that time, but kept it alive, making changes continually in its specifications. In this manner, he kept his patent pending for 15 years. It was finally issued in 1895 with a life of 17 years, which meant it would expire in 1912. Selden himself never manufactured a car although, in later years, there was a car made in Rochester, New York which carried his name. Selden had no connection with the enterprise.

As late as 1890, Selden had taken no steps to proclaim his patent, although many gasoline cars were being made at that time.

Colonel Pope of Hartford, Connecticut had started the Electric Vehicle Company, and in 1899 he had bought Selden's patent, with an agreement to share royalties with him. The Electric Vehicle Company was later to file suit against the Ford Motor Company for infringement. Ford and Couzens had refused to join the Association of Licensed Automobile Manufacturers, organized in 1903, which was licensed by Electric Vehicle Company. The first suit under this patent was against the Winton Company of Cleveland. The United States District Court handed down a decision against Winton.

As the Electric Vehicle Company went into receivership in 1907, the Selden Patent became the sole interest of the Association of Licensed Automobile Manufacturers. That organization had the right to refuse a licensing agreement to any automobile concern. This placed Ford in the position of being forced out of competition in the industry, even though he should desire to join the organization after having earlier refused membership.

The suit against Ford for infringement of the Selden Patent was brought by the Electric Vehicle Company in 1903, when it sued Ford's New York distributor, C. A. Duerr & Company. Years of legal wrangling followed, mountains of testimony accumulated. A decision against Ford and upholding the Patent was rendered in 1909, and

it caught Ford at the peak of production, bringing the threat of back royalties and probable damages which would have aggregated a tremendous sum. He appealed the decision and continued to increase his production.

The newspapers of the day were filled with warnings to every possible Ford car purchaser that he was liable to be sued. In the same issues of the newspapers were carried Ford advertisements that the company would issue a bond with every car sold to cover any damage for which the buyer might be subject.

It looked bad. A lesser man might have quit, might have thought this particular point a good place to stop. But in 1911, the United States Circuit Court of Appeals reversed the decision of the lower court, ruling that the Selden Patent was valid, but that it covered only the two-cycle engine and did not apply to automobiles which used a four-cycle engine. There was only one two-cycle automobile being manufactured at that time, and that was the Elmore car, made in Ohio.

BIDDERS MAKE OFFERS

It was reported in 1927 that Hornblower and Weeks offered Ford $250,000,000 for one-quarter interest in the Ford company. New York banking interests offered a billion dollars for the entire concern.

The first approach to absorbing the Ford interests was in 1908 when Durant and Ben Briscoe tried to purchase the Buick and Maxwell, and to include Reo and Ford. The proposal was along the usual lines of distributing stock in the new concern to Ford and Olds, but Ford demanded three million dollars in cash. A cash demand was also made by Olds. The proposed deal fell through.

After Durant had secured the Cadillac in his group, he again went after the Ford company in 1909, just after Ford had lost his first suit on the Selden Patent. Ford's outlook at that time was none too bright, and he agreed

to sell for eight million. Again, a stipulation that it had to be in gold was made. The banking group turned down the offer.

But in 1911, when Ford had won his litigation on the Selden Patent, and with profits rising rapidly, the last chance for buying Ford Motor Company had disappeared.

Ford made some important decisions in 1915 which were to influence the future development of the Ford company, and it was particularly important to the few remaining minority stockholders. The company's earnings had been mounting steadily. Ford had paid out more than 52 million dollars as cash dividends in the few years preceding 1915. In 1915, 16 million were paid to the stockholders.

In 1916, Ford had determined to expand his manufacturing facilities so that the company might make all of the component parts and units employed in production. This involved a program so vast as to dwarf his nearest single competitor. To accomplish this program, he cut dividends drastically. Stockholders being what they are, and with their own peculiar natures, were not entirely pleased. Late in 1916, the Dodges brought suit against Ford for arbitrarily withholding dividends out of the large earnings of the company, which, in their opinion, should have been distributed. This suit went further and asked that dividends not paid in previous years, up to that time, should be accounted for. It was also charged that Mr. Ford's sociological experiments had cost the stockholders heavily. They asked for fair dividends and hoped that the great expansion building program on the River Rouge might be stopped.

Ford had reasoned that the Dodges had done very well. They had never put a real dollar into the company and had enjoyed a most profitable parts business, at the same time receiving considerable cash dividends. As a matter of fact, the Ford dividends were assisting the

Dodge brothers to finance the manufacture of the Dodge car.

The court ruled against Ford in 1917, and ordered him to declare a cash dividend of some 19 million dollars which was to come out of the profits in 1916. Ford appealed the case to the Michigan Supreme Court which reversed the lower court and gave him permission to proceed with the expansion program of steel mills and blast furnaces at River Rouge. The decision with respect to repayment of back dividends, however, was sustained. By the end of 1919, Ford was in financial difficulties and was compelled to borrow at least 75 million dollars. This was the only time he was ever forced into the money market. While he was paying off this debt, he had incurred new debts to pay the old and to sustain his building program. He was caught with an indebtedness of more than 50 million dollars in 1920. Other motor car manufacturers were in the same situation. Large payments of back dividends to minority stockholders had dug deep into his finances. He had organized the firm of Henry Ford & Son, to manufacture tractors. He informed the minority stockholders of the Ford Motor Company that the firm of Henry Ford & Son would manufacture a new car in competition with the Ford. The minority stockholders did not want to sell what had been a good investment in the Ford Motor Company, but the spectacle of the majority owner of the corporation competing, with all the asset value the firm of Henry Ford & Son would have, did not seem to offer anything but decline in values of their Ford company stock. So they accepted Ford's offer to purchase their stock. It was brought out later in the tax suit of the Government against James Couzens that he had received $1,334 a share for his stock.

From 1919 on, the Ford Motor Company was an absolute family affair. This deal cost Ford more than 100 million dollars, but no one could now question any of

his decisions.

Ford proceeded to get his house in order, as the false prosperity of 1919 was passing and the dark days of 1920 and 1921 were approaching. He kept adding to his development at the Rouge plant. To meet the slowing automobile market, he declared a sensational price cut in Fords, another surprise move. The increased sales resulting, although at smaller margins of profit, and reduced inventories, assisted materially in leveling off his financial picture.

Ford also made another unusual move at this time—a move which assisted him materially in financing through that difficult period. The Ford franchise was worth a great deal, and all Ford dealers had enjoyed lucrative business. The Ford plant, like many others during that period, shut down for a time, leaving Ford dealers with something like 100,000 cars on hand. Ford was anxious to further reduce his inventories, as he had material to assemble another twenty-five or thirty thousand cars. This material was assembled and the cars shipped to the dealers without their order. The dealers had the option of accepting or refusing these cars, but, I believe, the record shows that practically every one of them took up the draft, as they did not want to risk losing their valuable franchises. This move on Ford's part produced about 15 million dollars more, fitting very nicely into the tight picture at the time.

Ten thousand dealers sold almost half a million Ford cars in that year. It has been charged that Ford forced his ten thousand dealers to take these cars whether or not they were wanted or whether or not the dealer thought they could be sold. They were sold, and although the price had been reduced—the sedan from $795 to $660—the dealers profited enormously. There probably were a lot of squawks when Ford sent out these cars on draft, but it is not on record that any dealer went broke

because of it. The cash that came in probably did not represent a profit on the books, but it did make liquid a high-priced inventory which had been frozen—and that was a profit to Henry Ford. It was a shrewd Ford move to rid his warehouses of high-priced goods, and everybody, including Ford, came out on top. This enabled Ford to go into the market after the war and buy his new materials at depression prices.

FORD MEETS ANOTHER CRISIS

Henry Ford was under no illusion about the bankers who held his $75,000,000 paper. They were merely waiting and made no bones about it to take over the Ford Empire. This was probably the greatest crisis in Henry Ford's industrial life. He met it in typical Ford style and decision. He reorganized his entire business, cutting his office force drastically, reducing all paper work to a minimum, and doing away entirely with costly red tape. As an instance of his drastic economy, he removed 60 to 70 per cent of the telephones in the offices and plant and issued a memo to the effect that his workers from top to bottom should know their jobs so precisely and thoroughly that when they went to machines or desks, they should be able to do their work without benefit of telephones, with no delay or interruptions.

It was at this time that he reorganized his assembly lines and speeded up production by installing new machinery. This released money hitherto tied up in raw materials. When he had finished these economies, the overhead charge for making a Ford car had been cut from $146 to $93.

It was part of this economy drive which inspired him to establish assembly plants at strategic points. Parts were shipped to these cities and assembled at a minimum cost, the difference in profits accruing to Ford. At the same time thousands of workers over the country were added

to the Ford payroll.

The quick disposal of his surplus inventory of cars, plus $3,000,000 he forced his foreign distributors to collect immediately, together with the sale of nearly $4,000,000 in by-products, brought him about $25,000,000. He cashed in $7,900,000 in Liberty Bonds, and the sale of manufactured and unmanufactured goods in transit released $28,000,000. He had $20,000,000 cash on hand on January 1, 1921, and this, added to the quick money realized in the various methods mentioned, brought the total to $87,300,000.

In that month, January 1921, the bankers were perfectly willing to loan Ford the millions he needed to pay off his $75,000,000 debt which was due soon, but the obliging bankers insisted that they be allowed to put their own representative in the company as Treasurer. Ford told them in crisp, salty language that he wanted no part of their money. It was then that he was ready and able to pay off his huge debt, and he told the bankers to go step off a nice, high bluff. One of the most cutting remarks in his published memoirs was that the bankers to whom he was indebted wanted to put a treasurer in his factory, not an engineer.

Nine major books have been written about Henry Ford and his accomplishments. There have been dozens of minor books, hundreds of magazine articles, and literally tons of pulp paper have been used by newspapers to tell of his work and exploits. His three books of memoirs were written in collaboration with Samuel Crowther, standard Saturday Evening Post writer and political and economics commentator. Other major books were written by Rose Wilder Lane, Sarah Terrill Bushnell, Allan A. Benson, Samuel S. Marquis, J. G. DeRoulhac Hamilton, Ralph Waldo Trine, Charles Merz, Jonathan Norton Leonard and Ralph H. Graves.

Six of these books lose their potency and value to a

certain extent because they eulogize him so highly as to almost take the man's simple humaneness from him and build him into a god. No man could possibly be or hope to be as great and good—as absolutely perfect—as these well-meaning books portray Henry Ford. He was, first and primarily, a human being—and the first man to vehemently deny fundamental perfection would be Mr. Ford himself. He needs no deifying. His life and accomplishments stand for themselves, an eternal monument to a genius.

The Lincoln Motor Company went into bankruptcy in January, 1922. Ford took over. This voluntary bankruptcy was the result of hard going during the postwar depression years in 1919 and 1920. The company had a total indebtedness of $4,000,000, the stockholders having made little additional loans. Ford was the only bidder at the public sale of the property. His bid was $8,000,000, and, although there was no obligation to do so in the sales agreement, he assumed the $4,000,000 indebtedness against the company.

HIS HOBBY IS AMERICANA

In voluntarily paying these unsatisfied creditors, it is reported that Ford gave Henry and Wilfred Leland, who had taken a share of the Lincoln mortgage, at least a million dollars in cash. Ford and Leland "broke" shortly afterward as Ford, in an effort to increase Lincoln production, prepared to produce Lincoln parts in his Rouge plant. To H. M. Leland, this wasn't cricket.

Edsel Ford assumed direct charge of the Lincoln Division. Shortly after it became Ford's property, the price of the car was reduced, and the model improved. The Lincoln is Ford's one concession to the "luxury trade."

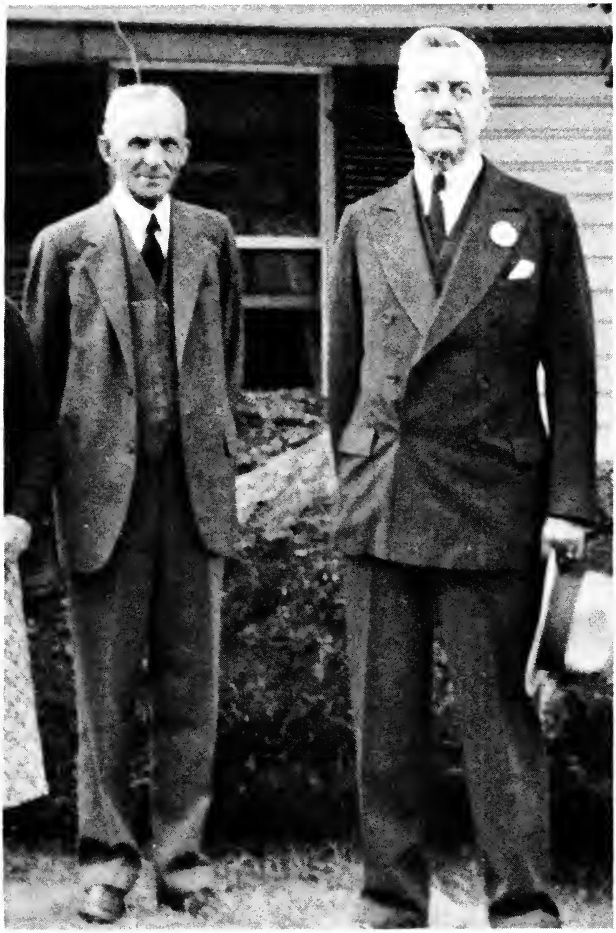
In the last analysis, Henry Ford has proven himself to be a philanthropist whether or not he is willing to

admit it. Somebody has attributed to him the saying that his ambition was to help the poor to help themselves; that is, to help men get on their feet, become independent and stay that way. However, whether he wanted it or not, his philanthropies and benevolences are manifest in varying degrees in Detroit and over the country: the great Ford Hospital of Detroit; the Edison Institute, the Museum, Greenfield Village and a similar development on his plantation, Richmond Hill, in Southern Georgia. Greenfield Village is Mr. Ford's effort to perpetuate for coming generations examples of the living habits and activities of their ancestors. The Village is not yet entirely completed. This, like so many wonderful things coming from the Ford brain, is simply an idea from which the perfect can be formed. In this Village are the original historic buildings which, when associated with the young American minds, contribute greatly to an understanding of this country's founding days. Here are: the Logan Country Courthouse in which Lincoln practiced and pleaded his cases; the old Clinton Inn; the Town Hall School; Edison's complete Menlo Park Plant; the old Waterford General Store and Livery Stable; Daguerreotype Gallery; Carding and Weaving Mill; Water-powered grist mill, and many other exhibits. These activities—the beginnings of America—are all in operation. Stephen Foster's home and the house in which the Wright brothers were born, are also in Greenfield Village.

In the Edison Institute, complete courses are included in the curriculum, with special emphasis placed on mechanical subjects. There are also laboratories with equipment for chemical and other forms of research.

Recreation and other facilities are provided, including one of the finest swimming pools to be found in this part of the country. All this equipment is available for enrollees of the Institute and the Greenfield Village Schools.

The Museum, itself, is complete. It is a miniature



HOST AND GUEST ON A PLANTATION

In this charming, informal snapshot the Author is shown with Mr. Henry Ford on the latter's plantation in Georgia. The sweater and skirt, barely showing on extreme left, are worn by Mrs. Henry Ford. It is unfortunate that whoever snapped the camera neglected to focus the three into the picture. This small print, cherished by Mr. Lewis for several years, is here published for the first time.

World's Fair, dealing with exhibits in art, china, glassware and furniture—early American in most instances.

The Transportation Exhibit, especially large, contains locomotives, railroad cars, street cars and every type of motor car from the first to the modern models of various makes.

There are, also, agricultural and farming implements and machinery of every kind and description. The steam engine section traces the steam engine from its beginnings to the present.

There are horse-drawn vehicles of every type, bicycles, boats and water craft, coaches and a section of airplanes and aircraft.

These interesting exhibits are all free to the public, and the pupils in the schools derive a liberal education from a practical study of the various items in which they are interested.

Henry Ford carries history to his 75,000 acre plantation in Georgia. There he has a replica of the old State House in Philadelphia, all in pine, painted white. On the plantation, also, is a group of buildings to aid in the education of pupils of the country schools—in mechanics, engineering, chemistry, and woodwork. Girls are taught practical domestic science. The boys make tables, chairs, dressers and other items, after first being schooled in cruising timber, sawmill cutting, and pattern work.

In a large, beautiful building furnished in Early Georgian style, the girls at school take turns in groups of ten or twelve, for a week at a time, in budgeting, buying groceries, cooking and serving food, table setting, use of glassware and linen, the prosaic household work of making beds and the proper care of a home. The school furnishes all modern kitchen appliances. These schools are an extension of the Georgian County School System.

Mr. Ford owns most of the County and pays, to all intents and purposes, the entire school tax. This extension

of the County's educational system is on his own account.

On the upper floor of the recreation building, there is a large assembly hall. Mr. Ford's own string orchestra at first provided music for dancing, under the instruction of Mr. and Mrs. Benjaman Lovett, who were then in Mr. Ford's employ. Mr. Ford introduced the old-time dances which come naturally to these Georgia boys and girls. Now the pupils provide music for their own dancing.

Years before most housekeepers were accustomed to modern gadgets, such as electric ranges, electric utilities of different kinds—the things that, in 1947, are commonplace to the average housewife—Mr. Ford had provided these for backwoods Georgians. During one of my visits to his plantation, I asked him if these modern gadgets for housekeeping would not make these young people quite dissatisfied in their present home conditions. And here came a bit of Ford philosophy. "That is what I want; if they grow accustomed to better living conditions, they will be better off. It makes more demand for more things which makes more work for everybody."

Henry Ford loves people, and he loves reasonable and sensible government. He takes umbrage whenever unreasonable people and unreasonable government intrude into his affairs. And Henry Ford's opposition is something to block the road. A good example is the position he took in opposing the "Blue Eagle" of the National Recovery Act, in 1933, when General Hugh Johnson attempted to coerce the Ford Motor Company into complying with the NRA program. General Johnson, a fire eater, needled the Ford Motor Company and Henry Ford almost daily, with caustic remarks to the press. The Ford Motor Company answered Johnson with paid advertisements. When the General finally announced that the Ford Company would get no more government business unless it complied with NRA requirements, Mr. Ford blandly referred to this, and other

statements of General Johnson, as "expressions of opinion and not of law."

Ford was right. The United States Comptroller ruled that Ford could not be prevented from receiving Government orders because of his opposition to NRA—and that practically ended the "Blue Eagle." It began to moult and soon was dead.

HIS 1918 EDITORIAL FITS TODAY

On the day this is written, President Truman has thrown away the chains which for five years, for good or for evil, have fettered American free enterprise. Today he announced, that from now on in America, business was on its own. There are numerous men in our major parties with political "vision." Idealism sprouts from every nook and cranny of the national political scene, but I wonder if among these well-meaning, well-known men there is one who has a practical and workable blueprint for America's future. Henry Ford had such a blue print, long ago. He, casually, offered it to the world, in 1918, in an editorial in his Dearborn *Independent*. I quote:

"Almost anyone you may chance to meet will tell you that 'something' ought to be done. But you will travel a long way before you will meet anyone with a practical plan. Many plans are not plans at all; they are pleasant pictures of conditions as they may be after all planning. There is something deadly exact about a blueprint. It is not a speech; it is not a propaganda; it is not a burst of enthusiasm; it is a simple thing of lines and signs; it speaks of only one quality—orderly work. Human history is full of the wreckage of high and noble intentions for social good and human betterment, which failed simply because they had the visionary quality without the creative quality.

"And one result of this is the almost universal assumption that whatever is good, generous, just and warmly

human, is prevented by those very qualities from being practical. There is an unspoken belief that if a plan is to be practical it must disregard humanity to a greater or less extent. Consideration of others and success for oneself are believed to be incompatible.

"Another result is the assumption that 'creative work' can only be undertaken in the realm of vision. We speak of 'creative artists' in music, painting and the other arts. We thus limit the creative functions to productions that may be hung on gallery walls or played in concert halls, or otherwise displayed where idle and fastidious people gather to admire each other's show of culture.

"But, if a man wants a field for real vital creative work, let him come where he is dealing with higher laws than those of sound, or line or color; let him come where he may deal with the very laws of personality and society. Creative work!

"Now, it is pretty clear that a creative plan, when it comes, will propose surprisingly little that is new; it will consist largely in a readjustment of the old things.

"We shall not outgrow the need to work. Some people are talking as if the 'good time a-coming' is going to eliminate labor altogether. Some people appear to think that the only thing that is wrong with our present system is that people have to work for their living.

"Well, we may be sure on one point: work is not what ails the world. The world would be infinitely worse off than it is, both physically and morally, if it were not for work. One of the danger spots of present time is that so many men are trying to evade work as if it were a disease. There is a class of men who regard the white collar as a sign of emancipation from work. An idea like that, if true, would soon bring the white collar into disgrace.

"Say what you will, the man who works with his hands has the best of it—other things being equal. And

what we all want in this country is that the workingman shall have the best of it all around. This cannot be done by abolishing work, for work cannot be abolished; but it can be done by abolishing those limitations and false practices which have kept from the worker the reward which ought to be his.

"Profit-sharing, additional annual bonuses, stock-sharing and dividends, a close and sympathetic interchange of counsel between the production and management parts of the business; or, to state it another way, between the strictly business and the strictly human aspects—these constitute a promising beginning. The human part must serve the business part, else there would be no great center of useful work, which would provide the living of all employed there; yet the business part must also serve the human part, else the service which the business can render to human well-being would be cut in half.

"The principle which must become clear to the mind of this and the coming generation is that good intentions plus well-thought-out working designs, can be put into practice and can be made to succeed.

"There is nothing inherently impossible in plans to increase the well-being of the workingman. If there has seemed to be, it is only because the world has heretofore thrown all of its thought and energy into selfish schemes for personal profits.

"If the world will give as much attention and interest and energy to the making of plans that will profit the other fellow, such plans can be established on just as practical a basis as the others were—with this additional advantage: the latter kind of plan will last longer than the other kind, and will be far more profitable both in human and financial values.

"What this generation needs is a deep faith, a profound conviction in the practicability of righteousness,

justice and humanity in industry.

"If we cannot have these qualities, then we were better off without industry. Indeed, if we cannot get those qualities, the days of industry are numbered. But we can get them. We are getting them.

"There will come men whose highest joy will be to diffuse benefits instead of accumulating heaps of personal profits which they will never use. There will come a race of men to whom money will mean only the opportunity to develop still bigger benefits for the men and their families who carry the world on their shoulders.

"If selfishness can only be curbed, if the long-range values can only be shown in their desirable lights, if men who are in authority could only see the wisdom of exchanging the low gratifications of mere gain for the finer gratifications of human service—why, then there would be no end to what might be done.

"The Good is the only practicable. Anything less than that is not only impracticable in any sense whatsoever, but it is vanishing too."

That brilliant and prophetic editorial would apply today.

CHAPTER 11

Efficient Edsel Ford Expands and Consolidates Empire

Edsel Ford, except by insiders and those who knew him well, was never given full credit for the enormous amount of work he did in helping to build—and maintain—the Ford Empire. And this anonymity pleased rather than displeased him, Edsel being a shy and modest man. The task assigned him by fate simply because he was his great father's son was gigantic—both in volume and importance—and had been for years before he became President of the Company. But Edsel Ford, because his father was so overpoweringly, so overwhelmingly a "character" on whom the searching spotlight of publicity always shone, perhaps did not receive full public credit for his accomplishments. Nor would he have wanted it so. He possessed many of the sterling qualities of his father. Yet Edsel always recognized the sagacity and ability of Henry Ford properly to time changes and moves which always kept the Ford Company in the public eye and mind. In other words, while Edsel Ford was the *working* president of the company, the not always shadowy figure of his father was ever in the background—and in the public mind. An analogy can be found in many another father-son combination. Young Teddy Roosevelt tried to follow the footsteps of his famous father. Young Teddy was a warrior, a courageous fighter, a statesman with an astute mind and an acute sense, politically. But the spoor of his rough-riding father left such an enormous and varied trail that his son could never hope to follow it. However, young Teddy's record both as a citizen and as a warrior

will stand on its own. As General Roosevelt in World War II, he was a decorated hero adored by his men, who died in the field not from bullets but from utter fatigue brought on by his sacrificial devotion to duty. The famous Rough Rider would have been justly proud of his son. Edsel Ford never hoped or tried to compete with his father for public attention. His job was to hold together that which his father molded—and this he did.

Edsel grasped the helm and moved forward. He was responsible for new practices in the organization, new lines of model and style changes, and nobody had a keener grasp of the details of the vast industrial empire.

Edsel was born in Detroit, November 6, 1893, the only child of Henry and Clara Bryant Ford. He was educated in a public school and in the preparatory college of Detroit University School. He went to work for the Ford Motor Company in 1912 as a trainee in various departments. After this thorough apprenticeship of three years, he became Secretary of the Company on October 13, 1915. He was made Vice President, as well as Secretary, in January 1917. On the last day of 1918, Henry Ford stepped down and Edsel Ford became President of the Company. He was elected Treasurer, as well as President, on October 17, 1921.

While he was officially connected with the Company for a quarter of a century, actually his association with it began when he was ten years old. His active personal interest in motor cars dates from 1902, when Ford was building the famous racer, "999," in a one-story brick shop at 81 Park Place in Detroit. He knew the company in all its vast ramifications better than any man, save his father, and when he died he had been at its head for nearly twenty years.

When Edsel Ford joined the Company, the then gigantic Highland Park Plant had been in operation four years, and mass production of the famous Model "T"

car was bringing out 180,000 units a year. He had watched the industry's growth from its infancy, seen many momentous changes. But the stupendous growth of his own Company—a growth from a modest 180,000 cars to 2,000,000 cars annually—must have been dazzling even to the son of Henry Ford.

Aside from the 1100-acre River Rouge Plant and the enormous engineering laboratories at Dearborn, the Company operated twenty-seven direct factory branches, of which fifteen were assembly plants. In addition, a score or more of hydro-electric plants manufactured Ford parts. The Lincoln Motor Company produced a luxury-trade automobile. A fleet of more than forty lake, canal and ocean vessels, coal and iron mines, farms and millions of acres of timberland were simply sidelines of the empire of which Edsel Ford was president. There was a vast rubber plantation in Brazil—a little world of its own—and over great stretches of foreign soil, thirty-one Ford companies operated. Many of these companies were in the path of Hitler and his armies, and again in the way of the victorious Allies. Most of these were destroyed during World War II. The future of Ford foreign plants is yet to be announced.

Edsel Ford quietly interested himself in every department of the business. He was particularly social-minded and advanced those educational and charitable enterprises made possible by the company and his father.

The elder Ford had little time for the expansion of these idealistic ideas, although they were close to his heart. He had been confined closely to the bitter struggle for existence in his highly competitive industrial world. Edsel had the desire and the inclination to further these Ford contributions. Among extra-curricular Ford enterprises Edsel supervised were the Edison Institute, with its school system and museums of Americana; historic Greenfield Village; the Henry Ford Hospital in Detroit;

the Clara Ford Home and Training School for Nurses, operated in connection with the Hospital; the Henry Ford Trade School and the Apprentice and Training Schools in the Rouge Plant.

HE PIONEERS TRADE SCHOOL

Edsel Ford was among the first of American industrialists to recognize the need for, and value of, trade schools. He operated these schools for the education of skilled craftsmen. Before Edsel's time—or at least before the time of his authority—few American manufacturers bothered to train their own skilled workers. It was so much easier for a manufacturer of American goods to meet at the docks ships bearing fully-apprenticed tool makers, die makers, skilled men in all crafts needed in this country, than to train them. Even in the beginning of the American Industrial Age, living conditions were so much better here than in England, Germany, Italy and Switzerland, that the best—and especially the youngest—were attracted to this country. Therefore, it was not unusual for a young, mechanically minded, talented European to set his ambition towards this country, finish a laborious apprenticeship in Europe, and set sail for America—with the assurance that some American manufacturer would meet him at the dock with the promise of a job, good wages and the chance to own a home.

It was a natural weakness on the part of manufacturers, but right down to the second World War there was a noticeable lack of native-born, highly-skilled technicians in this country. This is not to say that there were not enough all-around mechanics to fill any ordinary need. But the war put a premium on skill. Somehow, we found it.

The Henry Ford Trade School and the Apprentice and Training Schools in the Rouge Plant, under the direction of Edsel Ford, had tried to change this situation.

And other manufacturers had followed this line. But Edsel Ford had realized that American mechanics must be thoroughly grounded in the technology of machines.

During Edsel Ford's presidency, the Ford Motor Company directed its principles and practices to keep up with the changing times. He opened the Rouge Plant. The Ford Company abandoned temporarily the manufacture of tractors in the United States. The production of all-metal airplanes was begun in 1925 and ended in 1932. Edsel was head of the company when it made Eagle Boats, Liberty engines and other war materials for the Government during the period of World War I. Under his management, negotiations were begun with Brazil, which resulted in great experimental stations and plantations for the growing of rubber trees at Fordlandia—590 miles up the Amazon.

One of his father's hobbies and great ideas was to develop the soy bean and other agricultural products on Ford property for use in industry. This development was under Edsel Ford's management.

As I write this, I see that the soy bean has reached its peak—and possibly its end. They have quit experimenting with it at Ford's, at least for the time being. Mr. Ford "discovered" the soy bean about 1929 and was convinced that it would work industrial miracles—which it possibly did. Visitors at Ford's were given soy bean milk, soy bean butter spread on soy bean bread and became convinced that soon Mr. Ford would be making parts of his automobile out of soy bean material. He did. He made soy bean gearshift knobs, horn buttons, accelerator pedals and experimented in soy bean bodies. His research in that direction probably spurred work in plastics which were cheaper to make.

Edsel, with his lamentably short life, saw the beginning and the end of many of his father's economical "hobbies," some of which might have seemed fantastic

at first, but like the soy bean, usually justified themselves. Edsel followed all these ideas through.

OLD MODEL "T" GOES

Edsel Ford was at the head of the organization in 1927 when the Company discontinued production of the famous Model "T"—apple of the elder Ford's eye. More than 15,000,000 of these Model "Ts" had been made. By 1931, the Model "A" sales had brought the total Ford production to more than 20,000,000, and in 1933, the V-8 which had improved and modified its form to keep abreast of modern automobile production in design, power, comfort and performance, brought the Ford production total well beyond 25,000,000. The Ford plants had produced enough cars, were they all still running, to hold nearly everyone in the United States without too much crowding.

Edsel Ford interested himself in art. He was a member of the Arts Commission of The Detroit Institute of Arts, beginning in 1925. He was President of The Arts Institute from May 1930. With Mrs. Ford, he had been one of the most generous donors to the Institute, enriching the collection of nearly every department of the museum.

He was a man with the long view, keenly interested in aviation, and, where his father had little time for civic activities, Edsel threw himself into affairs of purely civic interest as aside from the interests of the Company. He had the prophetic instinct that what was good and of benefit to his community and country, would, in general, be of benefit to the Ford Motor Company. And this was not a selfish view. Had he lived, the present snarl over local airfields would probably have long ago been untangled. He seemed to have distance in his viewpoint, and his quiet, kindly presence inspired confidence and was always an inspiration to those who came in contact with him. Industry and this community specifically—and, for

that matter, the country as a whole—suffered a great loss in his untimely passing in 1943.

RUMOR FACTORIES

Rumor factories are vicious institutions. They worked overtime upsetting government, planting seditious ideas in the minds of the credulous, and have worked overtime, for good or evil, in upsetting time-established things. All through the fabulous history of the Ford Motor Company, the "rumor factory" has gone out of bounds producing statements, observations, guesses and prophecies concerning car models, finance, production, sales and management. This was, perhaps, because nobody could guess in which direction Henry Ford would jump. He was unpredictable.

The country in general, and Detroit in particular, has spent much time sitting on an edgy conjecture and wondering what would happen when this and that person withdrew from the organization.

When the Ford family acquired the last bit of outstanding stock, John and Horace Dodge left the Ford picture. Prophets generally conceded that Ford would be greatly weakened because of the known mechanical and production genius of the Dodge brothers. Nothing happened.

Many headliners who had, and were later to catch, the attention of the public, moved out—and each time the pallbearers made a dire prophecy for the future of the Ford Motor Company. Nothing happened.

These men resigned from the Ford Motor Company and nothing the dire prophets mentioned occurred: C. Harold Wills, engineer and metallurgist; Norval Hawkins, leading sales manager of the day; Frank Klingensmith, finance man; William S. Knudsen, ace organizer, ace mechanic, ace everything.

When Knudsen resigned, it was reported that Henry

Ford said he would rather argue with Knudsen outside the company than in. When James Couzens withdrew, many thought that was the finish of the Ford Motor Company.

The Ford Company lost many essential men, the loss of which might have been a death blow to a less independent company. William B. Mayo, nationally known engineer, left. E. G. Liebold, financial and confidential assistant to Ford for more than thirty years, left. And the well known C. E. Sorensen, hard-knuckled production genius, withdrew in 1944. When Peter Martin died, the Ford Company lost a trusted, longtime efficient member of the official family.

CHAPTER 12

Henry Ford II takes Helm and New Regime Begins

And now young Henry Ford II, eldest grandson of the great pioneer, has taken over. Henry Ford II was educated at Hotchkiss and Yale, but withdrew before graduation. He joined the Navy, but was released from that service at the death of his father, Edsel, so that he might begin to assume some of the responsibilities of the Ford Motor Company. His job—free-wheeling labor and industry, bringing them together and harmonizing them—is not one for a neophyte. The eyes of the whole world are upon young Henry Ford and the tremendous job that he has inherited. These eyes will not be uncritical. Management, government, unions and the public generally will carefully watch young Henry Ford. So far he has met the test. He has applied himself assiduously to the job of learning the intricacies of the vast Ford Empire, from steamships and mining to production and sales. He frankly states that he "has an awful lot to learn, but is working hard at it and having a lot of fun."

He was made a Director of the Company in May 1941 and Vice President in January 1944. He became Executive Vice President, second only to Henry Ford himself, and in September 1945, he became President, relieving his grandfather of most of his responsibilities.

When young Henry made his maiden radio speech after becoming President of the Company, some sycophantic newspaperman bleated: "Last night a new statesman was born." Which is a lot of hooey. With the examples of his father and his famous grandfather before

him, young Henry Ford is yet to be tested and he shows signs—strong indication—of having the flare, the color—the *Ford* touch. He is modest, earnest, and likeable. He is democratic and sincerely likes people. This probably explains why everyone likes him. His contemporaries say he has shown an unusual capacity to grasp and learn the whys and wherefores of big business. He makes a splendid impression on all the older men who have had business contact with him—so it is fairly safe to assume that the Ford Motor Company will continue to be operated successfully by Henry Ford II and his brothers, Benson and William, in the years to come.

Henry Ford II has shown the decisiveness and incisiveness of his famous grandfather. To keep abreast of the times, the Ford Motor Company in 1945-1946 needed reorganization badly. Henry Ford II reorganized it, made drastic changes at the top. This was big news, and it amounts to a complete reorganization of the executive and operating divisions of the Ford Company.

Among the major changes:

Harry H. Bennett, long head of the famous Ford Secret Service Division, was succeeded by John Bugas, a Federal Bureau of Investigation official whose enviable reputation had endeared him to young Ford.

This was a smart move regardless of the relative merits of Bennett and Bugas. Unionism had forced its way into the Ford Company and was a factor to be considered at all times.

Bennett still was a Director of the Ford Motor Company, but in late October 1945, he resigned his directorate in order to devote full time to a private business he had formed.

The men young Henry has picked to help him operate the Ford Motor Company are: Ernest R. Breech, executive vice president; M. L. Bricker; D. S. Harder, vice president in charge of operations; John S. Bugas, vice

president in charge of industrial relations; J. R. Davis, vice president in charge of sales and advertising; H. L. Moekle, vice president in charge of finance; L. D. Crusoe, vice president in charge of planning and control; Albert J. Browning, vice president in charge of purchases, and H. T. Youngren, vice president in charge of engineering. Benson Ford is a director of the Company.

CHAPTER 13

Insurance Man Starts "Paige;" The Grahams Take Over

The Graham-Paige car originated about 1907 when Fred Paige, a successful insurance agent in Detroit, joined with Andrew Bechtel, an engineer, in developing and promoting a 2-cylinder, 2-cycle motor which Bechtel had designed and which was, subsequently, made the nucleus of the Paige Motor Car Company.

Prominent in the organizing group were E. D. Stair, publisher of the Detroit Free Press; Charles B. Warren, attorney, later ambassador to Mexico and Japan; Willis Buhl and Arthur Buhl, representing the Buhl family interests and enterprises; Alex McPherson, President of the Old Detroit National Bank; Sherman Depew, nephew of Chauncey Depew, and Harry M. Jewett, engineer and well-known track star.

The company was capitalized at $75,000. After an unsuccessful year experimenting with the 2-cycle motor, the car was redesigned as a 4-cylinder job. The company's capital had been largely depleted and it was reorganized with new money.

Harry Jewett was later made president of the company, and under his leadership the car quickly won public acceptance, particularly after a 6-cylinder model was brought out. The business expanded and a new plant was built on McKinstry Avenue, at Fort Street, about 1910. The company prospered and reached a peak year of 73,000 cars. Then, following the vogue of that time, it built a small car—the new Jewett. Like practically all such ventures of the industry, the new models, sold

under names divorced from the original company, quickly lost popular favor.

When John and Horace Dodge both died within a few months of each other, the Graham brothers—Joseph B., Robert C., and Ray A.,—were placed in charge of the business after the purchase of the Dodge Company by the banking group of Dillon, Read & Company.

The company had a phenomenal recovery. The three brothers stepped out of the Dodge organization, having in the meantime successfully built up Graham Brothers Truck Company. They ultimately sold the truck company to the Dodge Brothers ownership.

At this point, it is necessary to digress in order to bring in another angle of the story:

Harry Lozier, the bicycle manufacturer of Plattsburg, New York, had come to Detroit and organized the Lozier Motor Car Company, to manufacture a large car in the high-price bracket. Among the prominent stockholders were: Messrs. Stair, Warren, Buhl, Gilbert Lee and others, who had continuously urged Lozier to manufacture a car in the popular price class.

The Graham brothers, in the meantime, after disassociating themselves from the Dodge interests and casting about for another motor car enterprise, negotiated with and finally purchased the Jewett brothers' interest in the Paige Motor Car Company, for $11 a share, or approximately $840,000. Joseph B. Graham became President, and Robert C. Graham, Sales Manager.

That group of Lozier stockholders and directors saw in the control and management of the Paige Company by the Graham brothers an excellent opportunity to produce in volume a popular size model at a popular price. Pretentious plans included the building of a large plant in Indiana to supply bodies, and the purchase of the Harroun Motor Car Company plant, at Wayne, Mich. for use as a trimming shop.

In the later years, after the motor car market was dominated by a few of the large corporations, the production of the Graham car was continued with an ever-lessening output, notwithstanding the fact that it pioneered many of the new streamlined features which were to become so popular.

At the beginning of World War II, the Graham plants were filled with war work at which they were busy in 1944, when Joseph Washington Frazer headed a group which purchased the stock of Joseph B. Graham, the only surviving member of the Graham brothers. Frazer has joined with Henry Kaiser to produce two new models at Willow Run.

In eary 1947, the Graham-Page interests were merged into the Kaiser-Frazer Corporation.

KAISER-FRAZER AT WILLOW RUN

Joseph W. Frazer and Henry J. Kaiser have formed a corporation known as the Kaiser-Frazer Corporation, which is manufacturing a light, small car called the "Kaiser" and a medium priced car, with many engineering innovations, to be known as the "Frazer." The public evidently have looked with great favor upon this new enterprise, subscribing for the stock in excess of $50,000,000.

Many of the prominent buildings of the Willow Run Bomber Plant have been leased and equipped and both models are being produced there at this time. At the turn of 1946-47 the firm is reported to have produced over 15,000 units of both models.

CHAPTER 14

Early Ventures of 4 Young Men Evolved the Hudson

This is the story of the initial moves made by the Hudson group in establishing a great business.

I was in position to see many of these activities move from the stage of visionary ideas into concrete proposals, some of which led to subsequent success, while others dropped by the wayside.

I was in Lansing one day on one of my regular calling trips, trying to get more axle and bearing business from Olds Motor Works, when Coffin, Bezner, and Brady, through their spokesman, said, "You're just the fellow we want to see. Stick around until noon; we would like to have a talk with you."

At noon, we went down in the yard near the unloading platforms, and they showed me a telegram from Roy Chapin. Roy had severed his connections with the Olds Motor Works on March 1, 1906, and was in California. There he met E. R. Thomas of the E. R. Thomas Motor Car Company of Buffalo. Chapin, Coffin, Bezner and Brady had often talked about entering the motor car field as a group, and under a written agreement dated February 28, 1906, they had formed a co-partnership. The agreement was drawn by Roy's father, Edward C., an attorney. They capitalized the co-partnership at $6,000, equally contributed. So, when Roy talked to E. R. Thomas in California, he had something definite to offer. Plans were discussed, after which Chapin wired the big news to his associates in Lansing, asking their opinion. That was the telegram about which the boys wanted my

advice. It was a big decision to make. I knew them all very well and they wanted my opinion. We discussed the matter until the whistle blew, and, foregoing lunch, everybody went back to work, agreeing to meet that night to continue the discussion.

In thinking it over I came to some conclusions. "I travel all over the United States and meet the various groups of men interested in building motor cars," I told them. "I can see those who are beginning to make headway and I find that the groups that have men with sound, imaginative engineering skill, sound financial and sales ability, good purchasing ability and factory production experience, have the greatest prospect of success. In this case, you four men possess those qualities to a greater extent than is available in many of the concerns now operating or beginning to operate. In my opinion, if you are ever going to branch out in this business for yourselves, now is the time to do it, for you appear to have in your group as much balanced experience and ability as can be found anywhere."

There was much discussion about the "risk" to be taken. I contributed my opinion—that success in this business would follow the general pattern in its development by men who were willing to tackle the untried.

I remember good old Fred Bezner, near the end of the discussion, smacking the table and exclaiming, "Here I am talking about laying aside something that is *sure,* not the least of which is 200 iron samoleons every month, right on the line!"

The boys telegraphed Roy that they were all set and would join with him in the proposal. From that time on, that crowd went to work with the same spirit seen today in the larger and more successful firms.

Chapin and Thomas journeyed East from California and met Coffin at the Congress Hotel in Chicago. There the details of the new company were formulated. It was

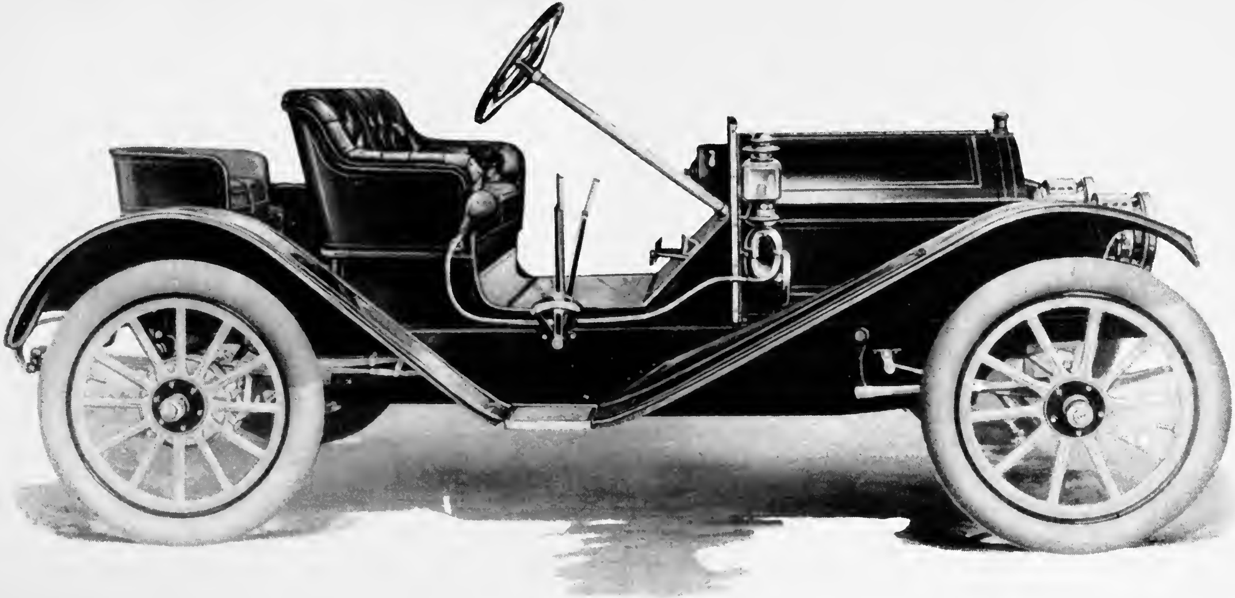
This noted engineer long ago helped establish standards that are "law" in auto making today.

HOWARD E. COFFIN

He was one of the first to argue effectively for good roads.

ROY D. CHAPIN

TWO HUDSON PIONEERS



THE HUDSON "TWENTY"

This model launched the Hudson Motor Car Company. It was the first low-cost car to be equipped with a selective sliding gear transmission. Over 4000 were sold the first year.

to be capitalized for $300,000—of which $150,000 was to be paid in. Thomas was to pay in $100,000 cash and the four others were to subscribe a total of $50,000, giving the four a one-third interest.

E. R. Thomas was elected president; Chapin, general manager; Bezner, secretary; Coffin, vice-president and Brady, second vice-president.

AGAIN, THE OLD HUNT FOR MONEY

In the meantime, the young men were faced with the staggering task of acquiring $50,000, and $10,000 of it immediately. Their original partnership agreement had called for an investment of $1,500 each, but that total of $6,000 for the four was apparently too small to attract an initial pro rata payment from Thomas. Roy raised $3,000, with some aid from his father. Coffin produced $3,000. Bezner borrowed $2,000 from his mother and Brady put in $2,000 cash. This capital gave the young founders only a toehold, as there was still $40,000 more to be raised to carry out the arrangement with Thomas and obtain from him the necessary investment.

By May 1906, only $30,000 had been paid in—$10,000 being raised by the partners and the rest by Thomas. They had prevailed upon Thomas to take an additional risk.

They leased the Modern Match Company's factory building on the railroad spur at Dequindre Street in Detroit, and, in a week's time, had it whitewashed and cleaned up. During the interval, they used a little downtown office in the Majestic Building, furnished with a couple of kitchen tables, filing cabinet, and a few chairs. It was there I drew up a contract for front and rear axles for a snappy model which Howard Coffin had designed to sell at $2,750. That model would not be a bad looking car today. They planned to make 500 cars the first year.

I said something, elsewhere in these pages, to the effect that the component and accessory firms of that day, frequently took contracts of a value greater than the total assets of the "expectant" car manufacturer. That was true in this instance. I had difficulty convincing my associates that we should take the contract. In those days one couldn't look in Dun & Bradstreet to find a rating upon which to base credit.

In taking orders one gambled on the chances for success. Credit had to be based solely upon the ability and integrity of the group, in its particular line, after making due allowance for over optimism and excess enthusiasm, which, after all, constituted at least fifty per cent of any such venture.

My associates were reluctant to risk buying all that axle material, insisting the group could never make 500 cars the first year. I bet them a cash sum they were wrong. We compromised on material by placing definite orders for 200 sets, with an option for 300 additional, and agreed that machine operations were not to start on more than 100 sets. Owing to the circumstances, I watched that outfit like a cat watches her kittens. They bought 503 sets of axles the first year.

They were on their way—and I won my bet.

Late in 1908, or early in 1909, George W. Dunham, an engineer who had been with the Olds Motors Works, and Roscoe B. Jackson, who had been with Olds and, later, with E. R. Thomas Motor Car Company, in Buffalo, designed a small car to sell at $1,750. They came to Canton to go over the axle job with me. They told me J. L. Hudson would probably be interested in the venture.

The Chapin-Coffin-Bezner group disposed of their interests in the Chalmers Company to Hugh Chalmers and took up this new proposition. Chalmers had become interested in the new Hudson car, as a smaller model which might add to his sales line. He therefore bought an

interest in the Hudson set-up. This arrangement was terminated by his selling his Hudson interests to the Chapin-Coffin-Bezner group at the time they sold him their interests in the Chalmers Company. In the latter part of 1909, they organized the Hudson Motor Car Company, with a capital of $100,000, divided into 10,000 shares at $10 par, of which $90,000 was subscribed. The amount of stock actually paid in, at that date (February 20, 1909), was $40,000, of which amount $15,000 was paid in cash and $25,000 in other property. This stock was held by Chapin, Coffin, Bezner, J. L. Hudson, R. B. Jackson and George W. Dunham.

Land was purchased on East Jefferson Avenue, where the plant now stands. Their venture was a success from the start. Roy D. Chapin was president, Howard E. Coffin, vice-president in charge of engineering, and Fred O. Bezner, vice-president in charge of purchasing.

The duties of these men were heavy and onerous. They asked me, one day, if in my travels around the country I had seen anyone I could recommend to take charge of purchasing. Ultimately, I made two suggestions. One of them was W. J. McAneeny, who was then purchasing agent for the Pope Manufacturing Company, at Hartford, Connecticut. He was later engaged. R. B. Jackson advanced to the presidency of the company, and, several years later, was succeeded by W. J. McAneeny.

Howard E. Coffin retired from active connection with the company in 1930. Bezner had retired in the early 1920's.

Subsquently, Fred Bezner went abroad. He maintains a residence in London, as well as in Detroit. He is the owner of Redwin Aircraft Company, Ltd., and Fairfield Aviation, Ltd., both of which did excellent war jobs in aircraft parts, in England.

A. E. Barit was associated with Bezner in the purchasing division, at the start of the company, and later

became president, an office he held until recently.

A NEW DEPARTURE

WHAT! NO GOGGLES?

Eugene W. Lewis at the almost perpendicular wheel of a 1908 Northern. This short-lived car had a two-cylinder, opposed-transverse engine. It sat sidewise across the front under the hood. Note the conventional linen duster. Is somebody peeking out of upstairs window? An old snapshot.

CHAPTER 15

Nash, Dollar-A-Day Trimmer, Joins Automobile Great

The story of the Nash car starts with the purchase by Charles W. Nash in July 1916 of the Thomas B. Jeffery Company of Kenosha, Wisconsin. Jeffery produced the Rambler car, well known in its day.

Charles W. Nash gained a broad manufacturing and financial experience in the Durant-Dort Carriage Works of Flint where he began work as a trimmer for one dollar a day.

When William C. Durant assumed control of Buick he quickly recognized Nash's potentialities and Nash became one of the dominant figures in Buick's management. As Buick was the keystone of General Motors organization, Nash was given a great deal of credit for that company's success. When Durant was forced to resign from General Motors in 1910, Nash was named President of the Buick Motor Car Company where he again proved his capacity for executive management. At the time he accepted this job, the motor business was in bad health. Finances were depleted, a high surplus of stocks and parts had accumulated and many problems of manufacturing were yet to be solved.

Within two years Nash had replaced the old Buick with a new 6-cylinder design which at once caught public fancy. The Buick immediately became a huge success. This achievement resulted in Nash being named President of General Motors Company, in 1910, which post he held until 1916, when he resigned.

Charles W. Nash was one of the best all-around

executives of the motor industry, in my opinion. He was well-rounded in production, purchasing, accounting and sales experience and, as an executive, always retained the hearty cooperation and loyalty of his associates.

The first car bearing the Nash name was made in 1917. He followed the tendency of the times to offer other models under different names. The Nash Company brought out the "Ajax" in the low-price bracket and the "Lafayette" in the high-price field.

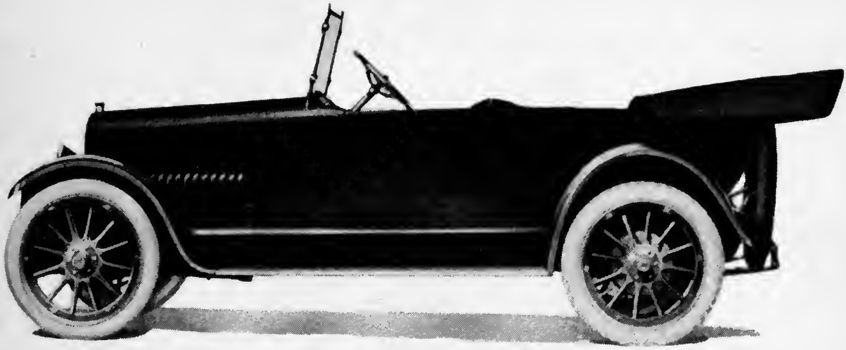
He retained active management of the Nash Motor Company until 1936 when it was merged with the Kelvinator Corporation, the combined companies operating under the name of Nash-Kelvinator Company.

Under the capable management of George W. Mason, as president, the Nash car maintains an enviable reputation with the public. Charles W. Nash is semi-active as Chairman of the Board.

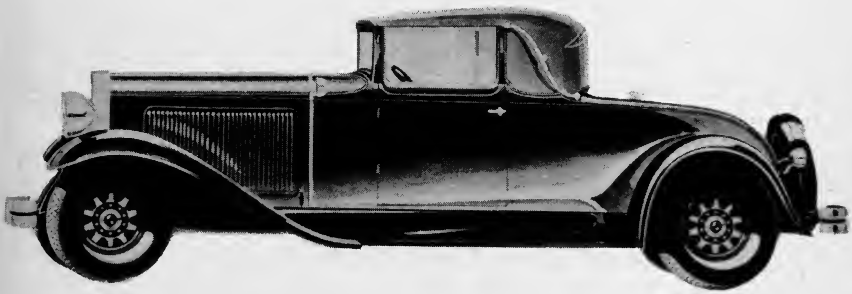
* * *

George W. Mason's first venture in the automobile business was in a dealership with his father, and later on with the Studebaker Corporation. In 1914, he went to Dodge Brothers. In World War I, he did a splendid job as coordinator of ordnance work in the Rock Island Arsenal. He had a short flare in the banking business; then returned to automobiles via the Maxwell Motor Car Company in 1921. Here, under Walter Chrysler, he equipped himself for the big things to follow in later years.

When the Kelvinator Company needed a high-grade man, Walter Chrysler recommended Mason. He was employed and the Kelvinator record from that time has been an enviable one. It was this record which so impressed Charles Nash that he proposed the merger bringing the two companies together as the Nash-Kelvinator Corporation. Mason was elected president of the Automobile Manufacturers Association in 1946.



NASH TOURING CAR (1918)



NASH CABRIOLET (1930)

Motor cars began to have that sleek and well-grooved look.

WHAT'S IN THE BASKET?

This snapshot was taken in Fowlerville, Mich., October, 1900, while H. Jay Hayes and J. C. Hayes were "touring" the State. It took the Cleveland body builders five days to travel 105 miles. In the original photograph, an old gentleman with a long white beard coming down to his third vest button is seen gaping at the new contraption. The lithographer could not reproduce him.

CHAPTER 16

The Olds Was Alma Mater of Many Early Builders

The Olds Motor Works was the early training school and college for a large number of bright young men who undertook a post-graduate course that was to result in their success or failure. That company had more employees and a larger organization than any other, it being the first volume producer of motor cars.

Early residents of Detroit will remember the Olds Motor Works, located on East Jefferson Avenue at the point where the Morgan & Wright plant (now U.S. Rubber Company) is located. The company experimented, like all early pioneers, with steam, electricity, and gasoline, making models of each and finally selecting the gas engine for motive power. The men of that company knew more about making gasoline engines than many of the early companies.

The Olds Company was originally a gas engine concern in Lansing, Michigan, which moved to Detroit when a company was formed to make motor cars. It did fairly well until March 1901, when the factory burned to the ground. Its prized "horseless vehicle" was saved from the fire, but all patterns and drawings were destroyed. Its foundry building remained and the officials immediately exercised the quick thinking that has so characterized the men who have been successful in the motor car business. They converted their foundry into a machine shop and were at work within forty-eight hours—while the ruins were still smoking.

Out of the aforementioned horseless vehicle model

came a little runabout marked to sell at $650. This got the motor car industry off to a good start. If the price of the first cars had remained at $1000 or $2000 over a long period, one can readily imagine how long it might have been before the volume production stage would have been reached and popular reception accorded "horseless carriages."

The $650 price tag was the kick-off.

The motor accessory business was given a good start at the same time. One of the first large accessory orders was given by the Olds Motor Works to Dodge Brothers for 2000 sets of transmission gears, and another to Henry M. Leland (later Cadillac and Lincoln manufacturer) for 2000 complete gasoline engines.

Lansing, having seen its chance to be the center of automobile manufacture slipping away when the Olds Engine Works removed to Detroit, took advantage of the situation, immediately after the fire, and through its Chamber of Commerce and others offered the Olds company a large tract of land and other inducements, including a small cash guarantee, to return to Lansing.

The famous curved-dash automobile was produced in quantities up to about 4000 cars in 1902, 1903 and 1904. I was the proud owner of one of these. This actually was the first effort at mass production.

This little Oldsmobile was probably the first automobile to adorn the pages of magazines. It appeared in *The Saturday Evening Post* in 1902 with a vigorous advertisement.

R. E. Olds was one of the first men in America to make a horseless carriage. In 1891, he built a steam car which received considerable attention in mechanical journals of the day. A second car—an internal combustion gasoline engine—was completed in 1895. He had been authorized in 1897 by his board of directors to "produce as nearly as possible, one perfect carriage."

The Olds Motor Works was incorporated in 1899 with a paid-in capital of $350,000, with R. E. Olds as president. Fred L. and Angus Smith were active in the company at Lansing. Their father, S. L. Smith, had induced a number of Detroit men to "risk" money to produce a motor car. This stock, as the record shows, became valuable. The original investments were not only paid back but investors received cash dividends in excess of 100 per cent. Later, this capitalization was considerably increased and became the trading basis of the absorption of the company by General Motors.

CHAPIN USES ERIE TOW-PATH

Olds pioneers who later were to make their mark in the automobile business and were identified with the early Olds Motor Works were Howard E. Coffin, engineer, and Roy D. Chapin, sales manager. In attempting to popularize the motor car and introduce it to the public, generally, and to convince sceptics that the new "baby" motor car was an instrument of practical use, Chapin made a cross-country run in a curved-dash Oldsmobile from Detroit to New York. It took him nine days to make the trip. There were few passable roads and Chapin used the tow-path of the Erie Canal a great part of the distance.

There was James J. Brady, whose monument stands on Belle Isle, Detroit, honoring him as a philanthropist and founder of the Old Newsboys' Association. Jim was in charge of factory work and transportation. In later years, he became Collector of Internal Revenue, at Detroit.

Walter Morley was purchasing agent, and a good one. Later, he headed Aero Car with Alex Malcomson (one of the original Ford stockholders) who, along with Chapin, Coffin, Brady, Fred Bezner and others, went on to new fields of adventure in the automobile business.

Charles Hastings, the auditor, later became President of Hupp Motor Car Company. Roscoe B. Jackson left to join E. R. Thomas of Buffalo, and subsequently became president of Hudson Motor Car Company.

Of the engineers, there were Guido Behn, of Hudson Motor Car Company; George W. Dunham, later with Hudson; Austin, who went with E. R. Thomas Motor Car Company of Buffalo; Jack Utz, who joined Autocar Company of Ardmore, Pennsylvania, and was later with Abbott Motor Company, of Detroit; J. G. Beyerline, who organized a company in Detroit to produce a car under his name. Pat O'Connor became connected with Packard then with Abbott and, later, with Liberty Motor Car Company.

There were men in the group who later became notable figures in the industry, such as E. H. VerLinden, R. H. Collins, and A. B. C. Hardy.

Another trail blazer whose name appears elsewhere in these notes—Charles B. King—was also connected with the Olds Motor Works. He joined Olds about 1900.

W. C. Durant's attention was early directed to the Olds Motor Works as a desirable addition to his newly formed General Motors Company. The Oldsmobile had made its own place in motordom. In November 1908, Durant bought the company, paying a nominal amount of cash and millions in General Motors preferred and common stock.

Of all these men who later were to achieve most notable success in the industry, probably Chapin, Coffin, Bezner and Jackson acquired the greatest fame. The Olds Motor Works was indeed a training school.

R. E. Olds resigned from the Olds Motor Works in 1904, as a result of a reported disagreement with the stockholders who wanted to enter the high-price field and produce a larger and more expensive line of models. Within a year, he was head of Reo Motor Car Company.

CHAPTER 17

First Packard Car Results From Winton Challenge

Dozens of motor car manufacturing concerns in the first days were off-shoots of pioneers who had scraped together some money and, perhaps with the financial aid of friends, were able to build one or two cars. Also, many of these one-or-two car men branched out and duplicated the operation. Mechanics migrated, small companies formed, sample cars were purchased wherever possible, improvements and changes made and new models were born.

The story of the Packard Company had its beginnings in a similar manner. In 1893, J. W. Packard and W. D. Packard had planned to build an automobile. In 1899, J. W. Packard bought one of the early Winton cars. Mr. Packard thought he could improve the car in many particulars. Winton challenged him to do so and Packard said he would. So he produced a one-cylinder car in late 1899. He continued to make this model until 1902.

The Packard story cannot proceed from this point without introducing Henry B. Joy. Joy was much interested in motor boats but was having difficulty in finding a motor that would start. He had been experimenting with steam. Joy saw a motor car in New York, the motor of which started on the first turn. It was a Packard. He purchased one of the cars and became so interested in its operation that he made frequent trips to the factory at Warren, Ohio. This interest motivated an active desire to build cars. Packard needed capital to produce in quantity, so it did not take the active mind of Henry B. Joy long to

make a proposition. He made a considerable personal investment and soon had a number of his friends equally enthusiastic. He and these associates secured control of the company.

In the latter part of 1902, the Ohio Automobile Company, as it was then known, voted to increase its capital to $500,000. At the same time, it was voted to change the name to the Packard Motor Car Company and move the plant to Detroit. A manufacturing program was set up and it was decided to add three more cylinders to the engine. Packard's opinion was that this addition would only multiply by three the troubles they already had.

During 1903, the company built and sold about 200 cars. It was one of the companies which pioneered cross-country trips in those early days. A Packard made the first cross-continent trip from San Francisco to New York. It was a gruelling 53-day grind but a complete success and, of course, a great advertisement.

Like almost all of the early adventurers, the company soon needed more capital. Its operations and experiments had placed it in the red. Of course, as and when every one of these pioneer companies became settled into any more or less methodical manufacturing process, their officials became convinced that greater production was vital. Public demand for cars was putting pressure on these men and the idea was being born that volume production would minimize the individual car cost. Also, it had become fairly easy to obtain money for such purposes.

Joseph Boyer was one of the early stockholders of Packard. When the time came again to increase the capital of the company, Boyer dropped out, selling at less than he paid for his stock and losing a lot of money by not staying with his investment. However, he built up a large fortune with his Burroughs Adding Machine Company.

Henry B. Joy was vehement in protesting to the Selden

Patent Association that its royalty fees were too high. He became the center of this protest to the extent that at three different times the association reduced its royalty—finally to a fixed minimum.

Joy was likewise indefatigable in his work for good roads. The country owes him much for his early efforts as President of the Lincoln Highway Association. He helped make a dream come true—a hard-surfaced road clear across the United States from ocean to ocean. In this he was ably aided by Roy D. Chapin, who was always the champion of good roads.

* * *

ALVAN MACAULEY, a patent attorney, had become actively identified with the Burroughs Adding Machine Company. As its general manager, he was approached in 1910 with a proposal to become general manager of Packard. Macauley had full knowledge of Boyer's connection with Packard, and, in view of the company's success after Boyer had disposed of his stock, he knew that the latter had regretted selling. He wisely accepted this position of tremendous possibilities and great opportunities. A few years later he became President of Packard and is now Chairman of the Board.

As president of the National Association of Motor Car Manufacturers, Alvan Macauley's leadership has been notable, and he has been re-elected year after year.

Upon his ascendancy to the chairmanship of Packard, M. M. Gilman was elected President and retained that position until 1942, when the able George T. Christopher succeeded him.

Other outstanding men have contributed greatly to the success and reputation of the Packard car. Among them is Col. Jesse G. Vincent, vice president in charge of engineering. It will be recalled that Col. Vincent was a leader in the group of engineers producing the famous Liberty motor, which functioned so well and added mo-

bility to World War I. In this work the contributions of Sidney D. Waldon, Howard E. Coffin and others were invaluable. Col. Vincent's work with marine and aircraft motors has further added to his reputation as a leading engineer.

James H. Marks and William Packer, until recently production manager and director of distribution respectively; Hugh J. Ferry, the efficient treasurer, and others, helped bring the Packard Company the high reputation and regard in which it is held by the public.

THE FIRST PACKARD

Alvan Maculey and George T. Christopher cram themselves into this 1899 Model "A" Packard. A lovely model of the day is amused.

CHAPTER 18

Pontiac, As Did Others, Grew From "Trial and Error"

The Pontiac succeeded the Oakland car, made by the Oakland Motor Car Company. The latter was organized by Edward N. Murphy, noted buggy builder, in Pontiac. He began with a 2-cylinder car designed by Alanson P. Brush. George Daniels was company president but withdrew and, for a time, manufactured a car bearing his name. George Hannum succeeded Daniels as president of the company. In 1924, Alfred R. Glancy (now General Glancy) became president.

The Pontiac car emerged after considerable experimenting with a motor designed by Henry Crane, a well-known engineer. The first models were considered too high in cost and were shelved in the Chevrolet laboratories. This is where Al Glancy entered the picture.

Alfred R. Glancy graduated from Lehigh University in 1903. Being a forward-looking young man, he took as his thesis what he hoped would develop into a job, it being a study of the automobile industry, then. With the help of a fellow student, he used, for test purposes, a 2-cylinder Cadillac, a single cylinder Knox, and a Stanley Steamer.

As the result of their exhaustive tests of the machines and of the "industry," the final paragraph in the graduating thesis included this statement: "The automobile is a rich man's toy and has no commercial future."

So, Al left the automobile "industry" flat to enter the mining field in the Upper Peninsula of Michigan. Many years afterward, when he was made a Trustee of Lehigh

University and was awarded an honorary degree of Doctor of Engineering, some of his close friends dug this thesis out of the archives and reread the final paragraph.

In 1915, the duPonts bought the Harrison Brothers Company and several smaller concerns. They hired Glancy to straighten out the kinks and get their new organization going. The duPonts had a large interest in General Motors and in the early 1920s Glancy was told to clean up the Samson Tractor venture of G-M, in which it was said that Durant had lost $42,000,000. Durant had set out to do two things: "lick Henry Ford in the manufacture of tractors" and "lick International Harvester Company in the manufacture of agricultural implements." The Samson Company built the first and only farm-built car. It was called "Nine people and a bull calf," jokingly, of course.

Al Glancy did well. He acquired the Glancy Malleable Iron Company and the Glancy Stamping Company and, at the age of forty-two or three, had decided to quit to become a country squire. However, Alfred P. Sloan, Jr., sent for him about that time and asked if he would do one more job for him.

Glancy considers Sloan one of the farseeing automobile men of the country. In 1924, the cheap cars were all 4-cylinder. The Essex car (made by Hudson) was just coming into prominence and it was believed that General Motors should have a 6-cylinder car in the low-price field. It was feared that if G-M did not invade that field someone else would.

Henry Crane was, and still is, consulting engineer to Sloan. At Sloan's insistence, Crane, through the Chevrolet laboratories, designed a 6-cylinder car. It was the only car with a short bore and a low pressure flood system of oiling. It was what is called a slow speed, soft engine, low-ratio. After the engine had been developed, it was given to George Hannum with orders to produce a low-

priced car. He turned out his Relot model in 1921-22 at about $1200. Sloan said that was too high, and turned it over to A. B. C. Hardy, who hit the $1400 to $1500 bracket.

Glancy wanted to do some things that would require new engineering and asked Fred Fisher to recommend a top-flight engineer. Fisher told Glancy that he thought enough of Benjamin Anibal to send him down to the New York show to make a complete engineering report on all the cars shown there. Glancy hired Anibal. Penn Holden, test engineer; Herman Schwartz, electrical engineer, and Roy Milner, body designer, had all been under Henry Leland at the Cadillac, with Anibal as Chief Engineer.

"When I hired Anibal I thought I was hiring a chief engineer but found I had hired *four* men," Al Glancy recalled, "and, in my opinion, they made one of the finest groups of engineers ever teamed in the business." He paid them the high compliment of calling them "commercial engineers, because never was anything costing one dollar incorporated in the car that could not sell for a dollar sixty."

When Dick Collins left the Cadillac and purchased the Peerless, in the early '20's he offered partnerships to this group to leave Cadillac and join Peerless. They accepted, but the Peerless blew up and they were out of jobs.

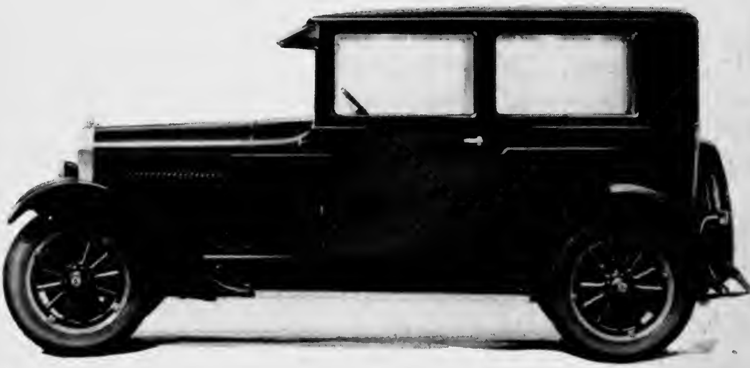
Early in the fall of 1924, the four engineers (Anibal, Holden, Swartz, and Milner), together with Glancy, began to work on the problem of producing a cheap 6-cylinder car. They consulted Henry Crane to help them accomplish their task. They took the Chevrolet chassis and lengthened it, dropped the so-called Pontiac engine in it, reshaped the fenders, radiator, etc., and called it the Pontiac. The name was the joint production of Henry T. Ewald, advertising man, and Glancy. Gradually the Pontiac Company began making transmissions

and other units. After a time, it was a real, "honest-to-God Pontiac car," as Al Glancy described it.

The company was then showing good earnings and from 1931 sales topped $150,000,000. The Pontiac has steadily gained in popularity until today it has reached new heights in public interest.

The operations of the Pontiac Company from the days of George Daniels have been under the presidential management of George Hannum, Alfred R. Glancy and Harry J. Kingler, the latter at present the capable and efficient President of the Pontiac Division of General Motors.

PONTIAC SEDAN (1926)



IT BEGAN AS A METAL "STEW"

Alfred R. Glancy (now General Glancy) wanted *one* engineer but (luckily) found he had hired *four* men—Anibal, Holden, Schwartz and Milner, a noted quartette. They, together with Glancy and Henry Crane, took a lengthened Chevrolet chassis, reshaped fenders, radiators, etc., gave it the so-called Pontiac engine. It became the first Pontiac (1924).

CHAPTER 19

Studebaker Pioneers All the Way —Wagons and Buggies to Cars

The Studebaker car, like some of its contemporaries, sprang from the buggy or wagon building business. The Studebakers have a long line of wagon building history back of them. According to the family history, John Studebaker built his Conestoga wagon and transported his family in it from Pennsylvania to Ashland, Ohio. He had ten children. Henry and Clement Studebaker went to South Bend, Indiana, to strike out independently. They were joined by other brothers.

John Mohler Studebaker joined his brothers in South Bend in 1853. He inherited the pioneer spirit from his father, so it was natural to find him building his own wagon and joining in the gold rush across the country to California late in 1853. His limited resources exhausted and not finding gold, John became a blacksmith, on taking the advice of an unknown friend that he "could hunt gold any time but a steady job is something sure."

He began by making wheelbarrows, not dreaming that five years later he would rejoin his brothers in South Bend, with a nest-egg big enough to buy out his brother, Henry Studebaker, and with Clement begin the real development of the Studebaker wagon business.

Another brother, Peter, was induced to join them and, through his salesmanship at St. Joseph, Missouri, the Studebakers received orders to make most of the wagons the Mormons used in their trek to Salt Lake City.

Their reputation had grown to such proportions that

they became the most important producers of wagons for the Union forces at the beginning of the war between the states. Their progressive firm was soon making all types of horse-drawn vehicles and had a world-wide market.

Transportation had engaged the interest and energies of all the Studebakers for generations. They naturally became interested in the new vehicle which promised to run without horsepower. In 1897, they began their experiments. In 1899, they were one of the earliest concerns making bodies for electric passenger cars. By 1902, they had developed their own electric car and truck. Two years later, they added a line of cars with gasoline motive power. Their first one was a 2-cylinder car. They quickly followed the trend of the times and produced a 4-cylinder line, continuing to make both models until they bought out the E-M-F Company.

I must digress for a moment to deal with the E-M-F Company, in order to follow sequence. Walter E. Flanders was a producer of crankshafts. He supplied the Ford Motor Company. Henry Ford spotted him as a "go-getter" and engaged his services at a salary and bonus for production up to 10,000 cars per year. Flanders promptly accepted and was joined by his chief assistant, Thomas S. Walburn. The Ford Motor Company produced 10,000 cars that year under Flanders' able factory management.

He resigned the following year and joined Barney Everett and William E. Metzger. Everett was a maker of tops and Metzger, genial and well-known, would rate as a super-salesman even today. The two lured Walburn from the Ford Motor Company and their "E-M-F 30" car was such an immediate hit with the public that the Studebaker Corporation made a contract with the company to purchase its entire output of cars. Late in 1909,

this arrangement was discontinued, Studebaker refusing to accept further deliveries.

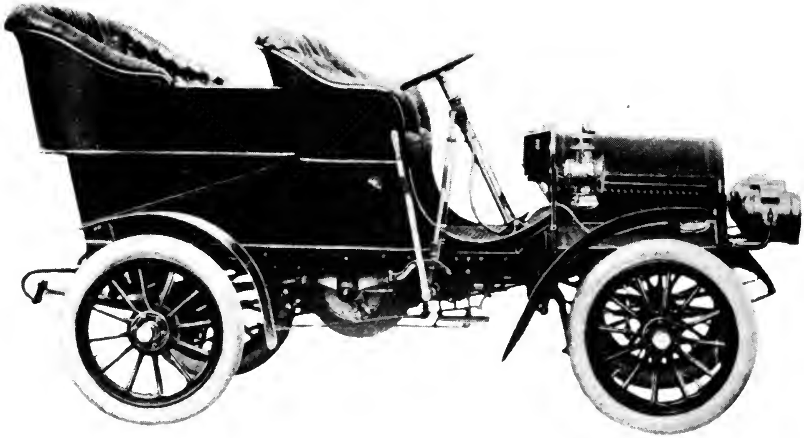
Bill Metzger, who had gone to Europe, came hurrying back. In the meantime, Flanders immediately put on a nation-wide campaign of advertising for E-M-F dealers. A new dealer organization was quickly formed and the company continued its operations until early in 1911, when the Studebaker Corporation finally bought the business.

Albert R. Erskine, a vice president of the Underwood Typewriter Company, joined the Studebaker Company in October 1911, bringing to that firm a broad executive and financial experience. By the end of 1913 he was elected executive vice president and by July 1915, became president.

In an effort to add further talent to the Studebaker organization, Erskine, in 1923, offered $26,000,000 on behalf of the Studebaker Corporation for the Maxwell properties. This was an effort to secure the services of Fred M. Zeder and his associates. Walter Chrysler, however, made a higher bid.

The operations and destinies of the Studebaker Corporation are now in the competent hands of Paul G. Hoffman, President, who began as an automobile salesman for the Studebaker Company, rising gradually through branch managerships to sales manager of the company in 1911. He became vice president in 1925 and has served as president since 1935.

The splendid history of the Studebaker Corporation records practically a century of tradition and experience in transportation—from wheelbarrows, covered wagons, buggies and carriages to motor cars and trucks, both electric and gasoline powered. The company is today one of the few successful car builders to have weathered all the storms.



GAS-POWERED STUDEBAKER

AN EARLY OVERLAND

First gas-powered Studebaker (1904) and a 1905 Overland.

CHAPTER 20

The Willys: Product of Tenacity And Super-Salesmanship

John North Willys owned a sporting goods store in Elmira, New York. He had an agency for bicycles, and in 1900 was attracted to the first automobile he ever saw. It was a Winton—a car to excite the dreams of many men in those early days. It is said that Willys made up his mind at his first sight of this car to enter the automobile field in some capacity.

A doctor, in Elmira, purchased one of the early Pierce motorettes, or Stanhopes. The car was equipped with a single cylinder, five horsepower DeDion motor. In true Willys fashion, John lost no time. He went to Buffalo immediately and met Colonel Charles Clifton, who frankly admitted the first Pierce car was only an experiment. Willys secured an agency through which he sold about half a dozen Pierce cars. Then he became agent for the Rambler. From 1903 to 1905, his retail sales were more than factories could deliver. He became agent for another car, the Overland, made in Indianapolis, and agreed to take the entire output. Overland delivered 47 cars. The following year, he ordered 500 cars, making a cash deposit to bind the deal.

That year, 1907, was a bad one for a number of struggling pioneer companies. The country was suffering a minor depression that erased some of the smaller companies and tested the mettle of those surviving. The Overland Company tottered and was about to go into receivership when Willys arrived. It had discharged its workers and paid them off with rubber checks that were

going to bounce. Willys tried to cover the deficit with his own check for $350. "Out of town checks" were not looked upon with favor at that time, so Willys—always a good salesman—sold the hotel proprietor the idea of cashing checks for no one until the $350 had come into his cash register from either the dining room or the bar. By Monday morning, a deposit of the necessary amount of cash was made at the bank and credited to the Overland Company, Willys explaining that he already had a cash investment in the enterprise and was there to protect it. The banker did not agree with Willys, as it was his opinion that the Overland Company would never recover. Willys worked fast. He got officials of the company together and obtained authority to meet the payroll the next Saturday in any way he elected—after he got the men back to work. He managed to keep the plant going by inducing the suppliers to furnish materials and persuaded his friends to contribute more money. The indebtedness of the company amounted to somewhere around $75,000 when work was halted.

The story goes, that Willys then went to a wealthy lumberman named Campbell in Williamsport, Pennsylvania, and got the promise of a loan of $15,000. It was Willys' idea to pay the creditors' committee ten cents on the dollar in cash and the balance in installments (where they insisted on such payments); otherwise, his proposal was to pay them in stock of the Overland Company.

Campbell reneged on part of the proposition but agreed to advance one-half the amount. The larger creditors were now faced with a situation which was to confront them many times in succeeding years—deciding whether or not to send a little good credit money after some bad with the hope of recovering—or whether to mark it off as a loss and quit.

If the latter policy had been followed with the com-

panies which reached the thin line dividing solvency and insolvency, there would not have been so many motor car companies left and, particularly, those which proved to be sound in policy and product.

Willys, the salesman, succeeded in persuading the creditors with whom he had made partial settlements to continue to supply materials on a 90-day term basis. He went a little further and got permission to use their names as references for further supplier credit.

The early part of 1908, Willys was made president, treasurer and general manager of the Overland Company, these titles naturally covering sales and advertising—in which he had already demonstrated a high capacity. He amazed the trade by producing more than 400 cars that year, making a net profit of over $50,000 and paying off the old creditors.

About this time he decided it would be pleasant to return to his home town of Elmira, New York, and build a monument business to himself. Willys heard that the Pope plant at Toledo was for sale. This sounded like an opportunity to get a complete operating plant for automobile production at a bargain. He had been offered the Pope plant for $285,000.

Col. George Pope in extending production decided to make his large, high-priced Pope-Toledo car, at Toledo, Ohio, and thereby affected the interest of John N. Willys, in the manufacture of motor cars, on a large scale.

WILLYS ENTERS "BIG TIME"

Willys painted a rosy picture for his directors and sold them the idea that, with that plant, they could make a million dollars. His salesmanship quickly spanned the gap between timidity and confidence on the part of his listeners. They agreed and he bought the plant, selling almost enough unneeded machinery and materials to pay for it. The Overland business then moved into the newly

acquired Pope plant at Toledo, beginning another phase in the remarkable career of John N. Willys.

The production of the plant, the fame of Willys and the Overland car, registered favorably with the public until 1920, when he again faced the rapids along with many companies. This was the year which tottered the Durant throne and sorely distressed many companies. Negotiations with bankers, over a period of several months —during which the sales naturally fell off—again raised a serious question as to whether or not he would be able to weather the second storm in his young career as a manufacturer.

During this period, he used all of his powers of salesmanship to build new agencies and contracts for sales. He got the citizens of Toledo interested in the idea of having a wellknown automobile advertise their town. Finally, a deadline of extension of credit was set at December, 1923. That gave Willys more than a year to make good. At this point, Walter P. Chrysler entered the picture.

It did not take Walter Chrysler long to clear out and convert into cash all unnecessary property, machinery and materials of the concern. The company was reorganized and Willys went on the road to sell cars and build up dealerships. He was so successful that by the latter part of 1922, the factory was running to capacity. Bank loans were cleaned up before the deadline, as promised. Another round for Willys and Chrysler.

The fine job Walter Chrysler did for the Willys-Overland company resulted in his being offered the management of the Maxwell Motor Car Company in June, 1921. He accepted.

By the end of the 1920s, clouds began to form again and a series of changes occurred, beginning with the resignation in 1929 of John Willys, as president. L. A. Miller succeeded Willys.

During the 'Twenties, Poland, an agrarian state since the dawn of its history, took up mechanics nationally. This step was actuated not so much by desire as by necessity. The new culture and industry had swept over Russia (mechanics could literally be called a religion in the Soviet) and was being imitated by the Central European countries. Poland followed suit. Herbert Hoover, a business man himself, appointed John Willys this country's ambassador to Poland in 1930, and Willys served until 1932 when he resigned.

In 1933, the company went into receivership with Willys and Miller named receivers. In 1934, Miller resigned as receiver and David R. Wilson was appointed in his place. Willys passed on in 1935.

In 1936, reorganization plans for the company were approved by the U. S. Board, and Ward M. Canaday became Chairman of the Board, and D. R. Wilson, president, which position he retained until 1938, when Joseph W. Frazer was elected president.

During the war, the company manufactured one of the famous army jeeps.

In 1943, Frazer resigned and in 1944 assumed the presidency of the reorganized Graham Motor Car Company; two years later, he joined partnership with Henry Kaiser.

In August, 1944, the Willys-Overland began a new chapter with Charles E. Sorensen, late vice president of the Ford Motor Company, its president. Sorensen was succeeded as president in 1946 by James D. Mooney, former vice president of General Motors.

* * *

THE "BANTAM" WELL-NAMED

The American Bantam car made its appearance in 1936. It is manufactured by the American Bantam Car Company of Butler, Pennsylvania. Small cars have been

popular in Europe for a number of years; that is, much smaller cars than the type Americans were accustomed to see. The European cars were three-wheeled, and the small four-wheeled cars were powered chiefly with a small motor such as is used in American motorcycles. The high price of gasoline or petrol has given this small type of vehicle its popularity in foreign countries. The average American has not, up to this time, looked with general favor upon a motor car narrower in tread and shorter in wheelbase than the one owned by his neighbors. However, World War II introduced a jeep which to a certain extent popularized this distinctive type of sturdy, economical car. It is narrower in tread and shorter in wheelbase than the small cars usually seen on the streets, and up to now it has not offered as comfortable riding as the orthodox car. However, with its bid for popular favor, it will undoubtedly add comforts and conveniences and will probably outdistance the small European car.

The American Bantam Company is proud of having the oldest surviving Army jeep placed in the Smithsonian Institute at Washington. This car was one of the first 70 "Pilot" models produced for the United States Army by that company.

CROSLEY MAKES NEW BID

The Crosley, a midget car, in appearance, at least, more or less like the British Baby Austin or the small Italian Fiat, has not yet been accepted fully by the American public and may not belong in this list of standard cars. However, a promotional campaign is now under way to popularize the new midget, with the avowed intention of making and finding a new low-priced field.

The car is severely plain, painted a serviceable gray, and its interior is austere to an extreme. As manufactured now, it has no upholstery, but, shortly, Powel Crosley,

Jr., its maker, expects to compromise between "luxury" and thrift by furnishing the car with synthetic pigskin upholstery and give his customers a choice of three pastel colors. The Crosley's Cobra engine is an assembly of sheet metal stampings and alloy tubing, copperbrazed into a lightweight structure—a new departure. The car weighs just over half a ton, is said to have a maximum speed of fifty miles an hour and to get fifty miles to a gallon of gasoline.

Powel Crosley, Jr., is better known as the owner of the Cincinnati *Reds,* Radio Station WLW of Cincinnati and as a manufacturer of kitchen equipment and radios, but he tried his hand at making automobiles long ago.

About 1906 he raised $10,000 and produced the Marathon Six in Cincinnati—and got half a dozen orders —but was wiped out in the panic of 1907.

The "bug" remained, however, and he tried again in 1939 with a forerunner of the present midget Crosley. It was a mechanical failure, however, its engine lacking horsepower, and gained no popularity.

THE FAMOUS ARMY JEEP

Germans and Japs got to know this model well.

CHAPTER 21

About Men And Incidents In Retrospect

In the effort to deal with the twenty-two models of motor cars, as the public knows them by name today, it will be noted that a number of them bear names of early pioneer experimenters. Then there are the names of other individuals who, perhaps, did not qualify in the early days as "inventor-builders of first models," (like Haynes, Winton, Olds, Ford, and others) but who cut tremendous figures in the industry through their abilities in organizing and administration, or through financing, operation and sales, or a combination of those abilities. Such men were Ben Briscoe, Hugh Chalmers, Walter Chrysler, John Willys and William Knudsen, to mention only a few.

There was another long list of men who started in early to experiment and work for other men and concerns in the development of the motor car: J. D. Maxwell, the Brush brothers, Walter Flanders, Fred Dusenberg, Harry Stutz, and numerous others, many of whom produced cars of their own, later on.

The 45-year span in the motor industry, from 1900 to 1945, is studded with brilliant performers. Some rushed across the stage and into the wings fairly rapidly. Others basked in the spotlight for longer periods, only to fade when it took more than showmanship and advertising glamour to sell motor cars.

In an industry which grew so enormously and so rapidly in such a short time and where the ever-changing utility demand asserted itself, requiring constant and

rapid changes in engineering and methods of production, it is interesting to observe how many versatile men were able to meet those changes and retain a high spot in the industry over a long span of years. The last ten or fifteen years have taken their toll, of course.

* * *

THERE HAS NEVER been a more forceful, competent and enthusiastic personality in the automobile business than General William S. Knudsen. His achievements and accomplishments in the industry have left an everlasting mark. His great ability as a producer and his ingenious methods of accomplishing the new, his uncanny ability to organize ineffective and, in some cases, antagonistic elements into cohesive forces, is remarkable. These talents and abilities aided the country inestimably during World War II.

Great as has been his acclaim there are many who still feel that enough credit has not been given to General Knudsen for his heroic work, particularly in the early stages of the war when we started with less than nothing. Through it all General Knudsen exercised those principles and the same human understanding that brought about his great success in civil activities. Through many trying situations during his war service, Knudsen's keen sense of humor held him—and the country—in good stead. Had he been an emotional or temperamental man, the whole story of conversion might have been sadly different. But during all those first grave months when this country was flexing its unused and untrained muscles, General Knudsen stalked the land, visiting hundreds of industrial plants, a twinkle in his eye and a shy smile on his lips—a living, walking symbol of American confidence and strength. At a small dinner one night he told us about a trip he made into the Middle West with the Assistant Secretary of War and some other high officials. They were checking up on materials, supplies and work. In one plant,

this group of dignitaries and so-called "brass hats" were walking down the center aisle of the factory as shifts were changing. A little ninety-pound woman worker in slacks sailed by with a lunch box under her arm and with a wave of her hand, called, "Hiya fellows!" Simple incident though it was, Knudsen seemed really thrilled when, in telling of the experience he closed by saying, "There's America for you."

While struggling with a shortage of drop-forgings for some important part of the war program, he visited another plant in the Middle West on a blistering August day. The side panels of the shop were up to allow air to circulate through, but little came in. Knudsen stepped outside for a moment to get a breath of fresh air. As he did so a six-foot workman, begrimed and sweaty, came up and said, "General, may I shake hands with you?" With his customary grin and democratic spirit, Knudsen shook hands. The workman said, "Thanks. I'm going into the service tomorrow morning and this is probably the only time I will have a chance to get this close to a 'brass hat'." Simplicity and friendliness are Knudsen creeds.

Knudsen's rise from bicycle mechanic to superintendent of Keim Mills of Buffalo, in 1902, then to the Ford Motor Company in charge of building assembly plants, to general manager of Matthews & Ireland Co., makers of lamps, to Vice President of Chevrolet in 1921, was a brilliant record of production achievements.

He next moved to Vice President of General Motors Corporation in charge of all automobile and body manufacturing operations. He became President of General Motors in 1937, which position he held until he entered the service of the United States Government, through the period of World War II.

* * *

Howard E. Coffin was a graduate of the University of Michigan, Class of 1893. He spent two or three years

combining work with the United States Postal Service and his studies at the University as a graduate student in engineering. During 1898-1899, Coffin constructed in the University of Michigan engineering shop his first combustion engine and his first automobile, a steam car. This car is now owned by the Hudson Motor Car Company in Detroit. From Engineering School he went, in 1902, to the Olds Motor Warks, accepting a tempting offer. There he was placed in charge of engineering experiments.

He became chief engineer of the Olds Motor Works in 1905, but resigned to join with his associates in organizing the Thomas-Detroit Company where he remained from 1907 until 1910 as vice president in charge of engineering and with its successor, the Chalmers Motor Company. When his group formed the Hudson Motor Car Company in 1910 he became vice president, director and consulting engineer. One of the principal figures in the formation of the American Society of Automotive Engineers, Coffin made his contribution in standardizing threads, gauges, etc., to the S.A.E.'s standards. This achievement removed great confusion from automobile manufacturing and made possible the start of quantity production.

Howard Coffin became a member of the Naval Consulting Board and chairman of the Committee on Industrial Preparedness in 1915. President Woodrow Wilson later appointed him a member of the Council of National Defense. Next, recognition came when he was named chairman of the Committee on Munitions and Industrial Relations and in 1919 he was made a member of the American Aviation Mission to foreign countries.

Coffin was deeply interested in aviation and was the founder and first president of the National Aeronautical Association of the United States. He was chairman of the Organization Committee of the $10,000,000 National Air Transport, Inc. (now United Air Lines),

serving as president of the company from 1925 to 1928.

Howard Coffin won lasting fame throughout the South for his development of Sea Island, the beautiful Georgia coastal island resort.

He passed away November 21, 1937, at Sea Island, Georgia.

* * *

Percy Owen, later president of the Michigan Bakeries, Inc., with headquarters in Grand Rapids, Michigan, until his retirement, was an early automobile salesman. Later he entered the ranks of manufacturers by organizing the Liberty Motor Car Company of which he was president. The plant was located on Charlevoix Avenue, Detroit, where he had erected an office building, which was a copy of Liberty Hall, in Philadelphia.

One of the first companies to open a branch salesroom in New York City was the Winton Motor Car Company. Owen was placed in charge. One of his early callers (all callers were only mild prospects in those days) was an official of the Schenectady Locomotive Works, who lived in Saratoga. He told Owen that if he could convince himself that he could drive one of those cars he would buy it, then added that he didn't care for a demonstration in New York City, as he would use the car only at Saratoga, if he bought it. He made arrangements for a freight car to transport the automobile to Saratoga on condition that Owen would accompany it. They agreed to meet at a certain point in the railroad yards.

Percy made the trip by rail and after some difficulty got the automobile off the flat car at Saratoga. Then after much "prepping" (Percy had his fingers crossed) and wondering if the carbureter, ignition, and the other gadgets would throw him down, or if they would perform as they should to conclude a fine prospective sale with its great advertising value, all was finally ready for the great adventure. "Mr. Prospect" seated himself beside

Owen, giving directions all the while, "Go up this road," "Now turn left," "Now turn right." Everything was going smoothly insofar as the Winton was concerned. The last instruction, "Turn right," brought them into the head of the main street in Saratoga. "Now we will go down this street," remarked 'Mr. Prospect,' "all the way to the foot of the hill."

There were—and are now—two of the largest hotels in the country in Saratoga, The Constitution and the United States. Both are located on this main street. Furthermore, there was a continuous rail in front of each hotel and here dozens of one-horse, two-seated vehicles were hitched. As the Winton approached, there was a sudden rising wave of horses on both sides of the street—horses standing on hind legs. They liked neither the sight nor the noise of the Winton. Many of them disliked it so much that they started to go away in a hurry. The street became a maelstrom of empty carriages drawn by horses which seemed to be trying to fly.

Through all the excitement, the prospective buyer just kept saying, "Don't stop, keep going," until the end of the street was reached. Then more instructions, "Turn right," "Turn left." Owen wondered where he was going until he suddenly found himself back where he had started—in the railroad yards. The Saratoga gentleman suggested that there was a train leaving very soon. Owen had better go right down the track and get into a car, attracting as little attention as possible.

The car was reloaded and the prospect told Owen, "No motor car for me. I will be years settling for this. I'll never live it down."

In recalling this incident, Percy Owen said that he rather expected to see officers of the law come pouncing at any moment armed with an attachment for his dem-

onstrator. That would have been a catastrophe. Owen's entire capital of $1,000 was tied up in the car.

The demonstration of the Winton on this occasion was, fortunately, all right as far as performance was concerned. However, when an agent was lucky enough to give a good mechanical demonstration, he had then to overcome the fear and timidity of his client as to ability to drive, plus a predominant prejudice against the horseless carriage by all owners of horses and their friends.

* * *

ILLUSTRATIVE of the vision and imagination required in men who introduced the "horseless carriage" to the public, Alexander Winton is a splendid example.

Alexander Winton, of Cleveland, was one of the early producers to bring out a car with lines differing from the conventional followed by his own company and others. It was called "Model C," price $1,800. A handsome car. Winton, like most pioneers in those days, was a visionary and saw a great future for the automobile. Here was vision beginning to solidify.

I remember his visit to Canton, Ohio. He came to talk about Timken roller bearings. We had only a small shop there but at the time it appeared to us as fairly large. Winton walked over to one of the windows and inquired who owned the land on three sides of our plant. Then he said, "I think you had better plan for the future and buy *now* the land to the left and in back of you and get an option on the piece across the street. If you handle your business properly and make a good product you will need it all. The motor car business is going to be a very large industry."

We thought at the time that his prophecy was only the imagination of a genius. How thoroughly right his prophecy was has been verified by the spread of the Timken Roller Bearing Company plants—not only over

the land Winton indicated but for several blocks in all directions.

*   *   *

MOST OLD TIMERS remember the Owen brothers, Ralph and Ray. They established another of the first New York City agencies, but were not related to Percy Owen.

When R. E. Olds withdrew from the Olds Motor Works and began manufacturing the Reo in Lansing, the Owen brothers took the agency for the New York City area. They were good salesmen and excellent publicity men.

Old friends and customers remember Ralph's outsize watch chain. Made of gold, he wore it around his neck and looped it down until it finally connected with the watch in his vest pocket.

I bring in the Owen brothers and give them special mention, for they followed the early trend of trying to get more horsepower by having a very large motor. Four cylinders were usual in a motor but Ralph brought out the "Owen Magnetic" with a brute of a motor—something over a seven-inch stroke, as I remember, and about a five-inch bore. He fitted this car with 34-inch wheels. And, by the way, this was the nearest to a return to the horse and buggy wheel size. They were all striving to get away from any resemblance to the old-fashioned buggy or surrey. This, of course, was before the days of the self-starter, so one can imagine the difficulty of cranking a motor of this size, particularly in cold weather.

One night Ralph Owen joined the gathering at the Pontchartrain, where the talk as always was of forming new companies and discussing old ones. He invited everyone outside to Cadillac Square to see his "baby." The night was bitterly cold and the car had been standing there for over an hour. He heard the usual jibes of, "Will it run?" and "Where did you get the buggy

wheels?" Ralph said, "I am going to show you boys something and take you for a ride." He worked desperately trying to crank the motor and was game, staying with it as long as he had strength. Then various other members of the group took a hand.

After watching for a while, I slipped away to the drug store and asked the druggist to sell me a small bottle of ether. He wanted to know whether it was for suicide and if I had a prescription. I told him I had no prescription and didn't want to die so young. I explained why and what I wanted to do with it. A chemist had told me, only a few days before, that ether would start any cold motor.

I got the ether, and sauntered back to the crowd. They were about to give up the struggle when I suggested that Owen raise the hood. I would see what I could do. All motors were fitted, at that time, with cups at the top of the cylinder heads. I filled all the cups from my little bottle, opened the valves and let them drain, then told Ralph to try it again. That brute of a motor threw Ralph clear into the crowd and started roaring—and it did roar! And so did the crowd.

This incident created considerable stir. Everyone wanted to know what I had used. I was mysterious and said it was a secret formula. The spirit of the times immediately flared up. Right then and there we had many proposals to organize and form a company, with prospective stockholders right there in the crowd. After we had all gone back into the Pontchartrain and thawed out, I told them my "secret." The first time anything new or different is brought to our attention, we think it is marvelous! It is always so. And then the "wonder" becomes routine.

The Owen brothers experimented with a magnetic clutch. They were great advertisers and entertained on a large scale in projecting sales. They called the Owen

Magnetic "The Car with a Thousand Speeds." But the car, with its high wheels, magnetic idea, and other novel innovations, was not accepted by the public, so their project soon joined the lengthening list of early experiments that failed. Thus ended the Owen brothers' venture.

* * *

In 1892, Hiram Percy Maxim was superintendent of the American Projectile Company's plant at Lynn, Massachusetts. His father, Sir Hiram, had invented the Maxim gun. Hiram Percy was later to invent the Maxim silencer. Then, however, Hiram Percy was thinking about inventing an automobile. As a graduate of Massachusetts Institute of Technology and a practicing engineer, he was familiar with the principle of the internal combustion engine.

Maxim experimented with a combination of gasoline and air and rapidly became acquainted with the characteristics of motor fuel. By 1894, his three-cylinder engine, designed by Maxim and Colonel Herbert W. Alden (who made the drawings Sundays and evenings) was put on a tricycle. It ran a quarter of a mile from the Pope factory before breaking down, because the engine lacked a cooling device. He had no way of building a four-wheeled vehicle, lacking money. In the spring of 1894, he had met Colonel Albert A. Pope of Hartford, Connecticut, and visited the Pope Manufacturing Company. This company made carriages, bicycles and a few motor carriages driven by electric motors. Pope had investigated Maxim's gasoline engine and gave him a full-sized carriage with which to experiment in the Pope factory. In 1895, Maxim really completed his first gasoline automobile.

When Electric Vehicle Company acquired the Pope company, Maxim began to lose interest in the manufacture of the automobile and, in 1900, returned to the

munitions business, later developing the Maxim silencer on which his fame now rests.

* * *

Charles B. King, one of the earliest pioneers, had spent considerable time as a young man experimenting with gasoline engines for marine purposes and with pneumatic hammers. His hammers received the highest award at the 1893 Columbian Exposition.

Charlie, as his friends knew him, was always a studious young man, particularly in mechanics. He spent much time in designing and building experimental types of internal combustion motors. He was among the early thinkers in devising ways and means by which the gasoline engine could be made to supplant the horse in highway transportation.

The Detroit *Journal* of March 7, 1896, records the fact that King was the first man to run a motor-powered vehicle down Woodward Avenue in Detroit. Previous to that time, however, King had experimented at night with his contraption to see if it would run. The public daylight record, however, is as reported in the *Journal*. It is also reported that King made and sold the first complete automobile that was made in Detroit.

About then, Charlie's life might have been directed in a quite different channel had he accepted the offer of John Robinson to join his circus and run his "horseless carriage" in the street parade and in the big tent during the shows. Robinson bought the car and was in more or less constant correspondence with King concerning various mishaps to the car. The show traveled chiefly by road and King advised Robinson not to play towns with steep hills.

King had a little marine engine works and supplied the late Henry B. Joy with an engine, arousing the enthusiasm and interest of Joy and John and Truman Newberry. They joined him in his enterprise, in 1897.

Joy, the Newberrys and others later were instrumental in bringing the Packard Company from Warren, Ohio, to Detroit. King, Joy and the Newberrys all enlisted in the Spanish-American War in 1898.

King designed and assisted in building a 70-foot twin-screw yacht, the "Lady Frances," equipped with his engines, for an Eastern buyer, causing a ripple in those days, for the motor had many novel features new to the marine motor as then constructed. One feature was a self-starting device.

King, who early identified himself with the Engineering Department of Olds Motor Works, resigned after its plant burned in Detroit and before it moved to Lansing. While he was still with the Olds Motor Works, he recommended that Olds engage J. D. Maxwell, who had been associated with Elwood Haynes and the Apperson brothers in Kokomo and who later was to figure prominently in the automobile business. After he left Olds, King joined O. J. Mulford and others in the formation of the Michigan Yacht and Power Company.

The Gunderson brothers and William Barbour, with King and others, then formed the Northern Automobile Company. They started by making a runabout designed by J. D. Maxwell. Later, King designed, and the Northern Automobile Company produced, a two-cylinder-opposed motor, shaft-drive car. The two-cylinder, transverse motor, under the hood, transmitted its power through a shaft drive to the rear axle.

In 1910, King designed a car bearing his name. It had a four-cylinder motor at first; later an eight-cylinder motor. Between 500 and 1,000 of these cars were made. Before this he had gone abroad for two years, studying engineering, particularly motor design, and art on the side, being an artist in his own right.

The Northern Company was later sold to the E-M-F Company which concern was finally absorbed by the

Studebaker Company of South Bend, Indiana. Maxwell was with the Northern Automobile Company for about a year and a half. Leaving Northern he went to Tarrytown, New York, and joined Ben Briscoe in making the Maxwell car.

CHAPTER 22

Journals, Editors and Societies Helped the Industry Grow

The many activities that kept the motor industry constantly in the public eye, such as national and local motor shows, Glidden tours, Indianapolis Speedway races, and the so-called Reliability and Road Touring events, were all enthusiastically supported and proclaimed from the housetops by excellent trade journals. Only a few are left today.

The names of most of these journals will have a familiar ring to the old timer: *Horseless Age, Motor Age, Motor, Automobile Trade Journal, Motor World, Automobile Topics, Motor Life, American Motorist, Motor West* and *Automotive Industries. Automotive News* was a daily trade paper for years and is now published weekly. My old friend, Chris Sinsabaugh, was well known as editor at the time of his passing. George M. Slocum is still the publisher.

Everyone connected with the infant industry will remember Ed Spooner, who was a news photographer, automobile editor of the Detroit *Free Press,* and, later, I believe, one of the owners of the publication, *Motor West.*

In 1901, Sam Miles, the impressario of the Chicago motor show, merged two publications under the name of *Motor Age.*

Of course, the daddy of all automobile trade journals was *Horseless Age,* published by R. H. Ingersoll. The journal first appeared in 1895.

Old timers will remember Nort Van Sicklen, who

bought Sam Miles' interest in *Motor Age*. Van left this field about 1910 to become a kingpin in the speedometer business. Later, many of his friends were greatly surprised when it was announced that he had joined the Apperson Brothers Company at Kokomo, Indiana, as president.

Chris Sinsabaugh joined Van Sicklen on *Motor Age* as Associate Editor in 1905. Dave Beecroft, another name familiar to old timers, also became an associate editor on *Motor Age*. Sinsabaugh tells the story of these early trade journals, newspapers, and automotive dailies, most interestingly in his book, *"Who, Me?"* published shortly before his death. Sinsabaugh eventually found himself identified with practically all the good automobile trade journals, from time to time. He was variously connected as editorial writer with *Motor* and *Motor Life* and, between his work with *Motor Life* and the *American Motorist*, was news editor for the Class Journal Company of New York, publishers of *Automotive Industries* and *Motor World*.

In 1909, Harvey M. Swetland, who was president of the Class Journal Company, bought *Motor Age* from Nort Van Sicklen.

It was in the same year that the American Automobile Association, having acquired 30,000 members, launched its official publication, *American Motorist*. In 1925, Chris Sinsabaugh became editor of the AAA paper in Washington.

Right here it might be interesting to note that while the American Automobile Association (AAA) had 30,000 members in 1909, the Automobile Club of Michigan, a member of that association, has at this time over 251,000, said to be the largest in the world. This club with its varied services, under the efficient Richard Harfst, general manager, has made an outstanding record,

directed by an excellent Board of Governors, several of whom are Old Timers, serving since the club's inception.

Knowledge that I was one of the organizors of this club and on its Board of Governors for a number of years gives me pleasurable satisfaction. I believe that about 80 per cent of the membership of the club carries insurance in the Inter Insurance Exchange, an adjunct of the club.

Motor, built up from a combination of *Motor* and *Motor Boating,* was begun by William Randolph Hearst. It is, today, what might be called the *Fortune* magazine of the motor industry.

Julian Chase, of *Automotive* and *Aviation Industry,* also was connected with *Motor* and later co-owner of *Horseless Age.*

The *Automobile Trade Journal* has filled a special niche from the infancy of the industry to the present day.

At the turn of the century, the Class Journal Company and *Automobile* published a directory containing the names and addresses of all American manufacturers of motor cars, motorcycles, motor boats, and a list of the manufacturers of component parts and accessories. The directory is known today as Chilton's *Automotive Buyer's Guide* and is published by the Chilton Company of Philadelphia.

Automobile Topics suspended operations only a few years ago. Practically everybody in the automobile and parts business knew the genial, Irish publisher, Frank Roche, and his capable Detroit assistant, Claire Wight. Frank's *Automobile Topics* always carried the gossipy news about individuals and companies. After Claire died, Frank stepped out of the arena and is now enjoying the reminiscent life of retirement in Pelham Manor, New York, and Florida. I believe the publishers of Ward's Reports also publish *Automobile Topics.*

By 1899, the combined automobile companies had turned out approximately 25,000 cars. Local automobile clubs were being formed all over the country. Members, equipped with linen dusters, goggles, and gauntlet gloves, were beginning to make sorties into the country and surrounding cities. These "runs" took a lot of time, covered few miles, and resulted in a very liberal mechanical education for those participating.

It was in 1899 that the Automobile Club of America was formed. It was probably the first of many group associations to be launched to promote the motor car, including engineering, manufacturing, and distribution.

In 1900, the National Automobile Manufacturers Association was organized. In 1903, the Association of Licensed Automobile Manufacturers originated. (It was at this time that many manufacturers agreed to operate under the Selden Patent.) The Motor and Accessory Manufacturers Association, composed of makers of component units, parts and accessories, came into being at about that time.

In 1904, the very important Society of Automotive Engineers was formed. This group accomplished through the years, and is still establishing, many important practices and methods furthering production of automobile design and parts. One of its early achievements was to standardize threads and gauges. My friend, Col. Herbert Alden, is a past president of the Society.

At about the same time, the National Association of Retail Automobile Dealers received a charter, as the trade was now receiving cars in fair volume and many dealerships were being established in most states.

In 1905, the American Motor Car Manufacturers Association became a unit.

Practically all of these associations issued a paper or house organ of interest to both the motor industry and the owners of motor cars.

In 1908, the Commercial Car Manufacturers Association was organized.

In 1913, the National Automobile Chamber of Commerce and also the National Association of Automobile Advertisers came into being.

In 1918, the Automotive Equipment Association took over the activities of the Motor and Accessory Association.

These groups, each in its particular field, have all contributed largely to the stabilization and more or less standardization of the motor car from the drafting board to its ultimate owner and member of an Automobile Club.

CHAPTER 23

The Motor Car Is "Big Cousin" To Many Varied Industries

The historic geography of the United States shows that settlements and their first activities were established along the known and accessible natural transportation routes of the particular time. Streams and waterways came first, then trails and roads. When the railroads began pushing lines into undeveloped territory, community settlements and commercial activities immediately sprang up along such routes. Our good roads system has been pushed into every nook and corner of every state by the motorized vehicle.

The Automobile Industry has been big cousin to many and varied lines of business—directly and, in many cases, indirectly. It would take much space to summarize the industries which have been greatly benefited by the introduction of the motor car.

One does not think of building and construction, necessarily, in connection with the automobile business, but the influence of the motor car on housing, factory building, and, in fact, the entire construction industry, is enormous when viewed at close range.

Quite aside from the great road building campaigns, the result of the motor car's advent, the home construction business is closely related to the latter. Improved roads pushed out in all directions, making available cheaper land for home sites farther out, under better living conditions than was possible in congested areas of the cities where one or two miles from the office or place of work used to be considered a long trip. Now,

five, six, or eight miles is not inconvenient, nor does it involve the loss of any more time. These changes, of course, called for more and larger trucks to carry the materials longer distances, in less time and at lower cost than was possible with horse-drawn vehicles.

Carpenters and contractors have built more than 15,000,000 private garages; building contractors have erected 175,000 filling stations; 30,000 or 40,000 salesrooms and some 60,000 independent repair garages; large public garages in the cities with ramps running from floor to floor and garages built underground for hotels, office buildings, and department stores. There are bus depots, taxi garages and hundreds of thousands of tourist camps with their many buildings scattered throughout the United States—all running into billions of dollars.

It must be remembered, also, that special types of machinery and equipment have been invented in producing the motor car. Many of these special machines are automatic and have found their way into other and different industries, with great benefit to the latter through labor-saving and more efficient production.

Now that all motor cars are closed models, driven the year round, in the era we are now entering all such construction and production figures will continue to soar, as every type of building operation and road-building activity will be influenced to a greater degree than ever before.

It is well that the public mind is now more or less familiar with, and adjusted to, thinking in terms of billions; otherwise it would be somewhat difficult properly to contemplate and evaluate some of the prodigious figures resulting from the activities of the motor car industry, itself, and its effect on other trade lines.

Figures and statistics are more commonly read and studied by the average man today and he is apt to be

interested in some relating to car production, highway expenditures, gasoline consumed and others as given me recently by O. P. Pearson, Manager of the Statistical Department of the Automobile Manufacturers Association. These figures concern highway expenditures from 1921 to 1943 made necessary by progress of the motor vehicle. The total outlay for rural roads, in that period, was $31,547,000,000. Of that amount, State highways received $17,391,000,000 and County and local roads $14,156,000,000. Roads in National Forests, National Parks and Reservations, required an outlay of $554,000,000. Cities and villages paid $12,683,000,000 for street extensions. Therefore, a grand total of $44,784,000,000 was spent for road improvements. In addition to the foregoing amount, it is estimated that another $10,000,000,000 was probably spent on highways and streets prior to 1921.

The total number of passenger cars produced by plants located in the United States up to January 1, 1946, was 73,000,000 and the total of trucks 15,000,000, or a combined total of 88,000,000. In driving around on a Sunday afternoon, or on any popular highway in the United States, one might be inclined to think that the entire 88,000,000 were in motion, although we know that a large percentage of them have already gone to the scrap pile.

The 73,000,000 passenger cars had a wholesale value of $47,668,000,000 and the motor trucks a value of $14,673,000,000 or a combined total of $62,341,000,000.

If it were possible to get reliable figures on the dollar value of replacement parts and accessories, processed and sold since the beginning of the industry, the figure would undoubtedly run into the tens of billions of dollars.

The amount of gasoline consumed annually in operating these cars and trucks might be estimated from the figures of 1941. In that year, 24,192,000,000 gallons

were consumed. Multiplying the 1941 consumption of gasoline by the approximate retail price produces a fantastic figure when applied to the average life of the motor vehicle.

While all cars manufactured in recent years are excellent vehicles and, according to the manufacturers, require very little expenditure for upkeep and repair, nevertheless, this total figure, if it could be obtained, would add another interesting item.

The total wages paid the hourly worker in the automotive industry, since its beginning, aggregates about $19,000,000,000. This figure does not include indirect wages resulting from production costs of materials from forest or mine, nor their transportation, but applies only to the wages paid hourly to workers in the motor vehicle and parts plants, as classified by the U. S. Census Bureau.

Here is an interesting item: The total value of munitions produced by the automotive industry for World War I, was $375,000,000, while in World War II the industry produced approximately $30,000,000,000 of war products. That is exactly the same amount the public paid in special taxes for the use of automobiles since the beginning of the industry.

These and other similar compilations bring a startling appreciation of the value of the motor car industry and its amazing effect on our general economy.

THE WINDS OF FORTUNE BLOW

The real budding, ready-to-blossom time of the automobile and parts business, was, in my opinion, between 1905 to 1915 inclusive when great strides were made away from guessing and experimentation. Solid engineering, production, and sales practices were compounded into sound methods, not only as to mechanics of production but in public education concerning types and sizes of cars best suited to its uses. Heretofore, the custom

had been just to buy a horseless carriage.

The motor industry with its great ramifications reaching out to practically every product of field, farm, soil and human endeavor has made many men famous and has given others brief fame. It has made American cities known internationally, developed this country into not only a great power but brought world-wide recognition of leadership in mechanical engineering and production.

The winds of fortune and time have literally erased thousands of enthusiastic and visionary pioneers of the industry. Where great numbers worked as pioneers even greater numbers are now engaged in huge corporations producing cars and in the enormous parts and supplies industries—in combination the greatest single industry the world has ever known.

The automobile business faces the light, always looking ahead and seeking through intensive and costly research something new in the way of material, methods and practices with the view of enhancing the value and practical use of its product and still further increase its utility in the greatest transportation method yet devised by man for general use.

There are few industries where greater competition may be found, yet, in a larger sense, there exists an uncommon bond of friendship and camaraderie all through the industry. Early friendships are greatly valued. There is an understanding and full recognition of fair play and sportsmanship, which has survived through peacetime activity and during the late war. This commendable quality enabled the industry to make its outstanding contribution mechanically to bring to a victorious end World War II. The same spirit and the same qualities will continue to make the industry the great advance agent in leading the country back to a prosperous peacetime economy.

CHAPTER 24

Parts Makers' Engineering Put Industry on Its Feet

[The next three are among the most important chapters in Mr. Lewis' entire work. As far as I have been able to ascertain, no other author has bothered to give proper credit to the original makers of component units and parts for the vital and important roles they assumed during the hectic, trying—and sometime desperate—period the Automobile Industry was aborning. As the author states, the parts makers and others who had faith in the lusty but sometimes faltering infant, and who were willing to back this faith with money, credit, invention, enthusiasm, encouragement and sound advice, in the beginning, WERE the Industry. Mr. Lewis tells the story here.—THE PUBLISHER]

In reading various articles and books about the early history of the motor car, especially with reference to that period up to 1915, I have noted that little emphasis has been placed upon the highly important part played by manufacturers of component units, parts, and accessories. This neglect is strange, considering the undisputed fact that until about 1915 such manufacturers *were* the motor car industry. As I said before, many so-called motor car manufacturers in reality owned nothing but a name plate and an assembly building. The intricacies of specialized units, such as motors, axles, transmissions, carbureters, clutches and electrical systems, demanded a high degree of engineering, manufacturing facilities, and capital—and these the early builders did not have.

Anyone organizing a motor car company in the early

days could buy frames, axles, springs, wheels, motors, radiators, steering gears and electrical systems—all set up and ready to install. Bodies and even upholstered seats, and other parts, could be purchased and assembled, readying the car for all accessories, lamps and other gadgets to be added.

The motor car industry today is composed of corporate groups of huge concentrations of units which manufacture the several hundred parts, component units and accessories needed to produce the modern car.

In the early days every component part maker had to engineer the unit he manufactured in order to meet the requirements of many types and sizes of cars. Especially was this true if the unit had to do with power or transmitting power, carrying weight, or both, such as axles, bearings, motors and transmissions.

A great deal of experimentation and mileage was required on different types of cars on the road to actually find out what kind and size materials should be used. The builder always boasted of high horsepower and low weight.

It is interesting to speculate on the part played by the manufacturers of component units and parts in accomplishing in a few years what might have taken a decade or more if car manufacturers had been compelled to make most of their own units and parts as they do today. Any story dealing with the early production of motor cars would be incomplete without special mention of the highly important part played by the firms developing and producing such parts and accessories upon which the car depended for its success. Moreover, it would not be authentic if it neglected mention of the pioneer companies who had vastly more capital and resources invested in the gamble of the new venture than did the motor car makers themselves.

Hundreds of millions of dollars were employed by

the parts makers in building up their specialized industries. Numerous fields of special endeavor and special materials were invaded and many intricate engineering problems were solved—in the main by the trial and error method. And, incidentally, many a production genius was discovered, along with answers to the questions of requirements in meeting unpaved road conditions and the demands of inexperienced drivers.

In those early days, no single unit or fair-sized combination of units of car manufacturers could have commanded the vast amount of capital and physical resources necessary to produce all parts and accessories required by the motor car. These component parts manufacturers truly became specialists in their lines.

I have always believed that one of the main reasons why Detroit dominated the parts and accessory business was the fact that the city possessed, even in those early days, a great variety of skilled and semi-skilled foremen and workmen who had learned their trades the hard way and were not bound by orthodox mechanical training. These unsung men were not rule-fettered and would try anything once. The making of cars and component units was all new and there were few precedents to follow.

DOLLARS AND DARING DID IT

The East had an abundance of skilled mechanics and money. Its capital was chiefly invested in minimum-risk enterprises, such as insurance and established railroad and utility stocks. There was little inclination for precarious speculation in unknown and untried enterprises. The Middle West, however, and particularly Detroit, was growing fast, had the pioneer spirit and plenty of money with which to pioneer. It seized its opportunity and took the long chance—win, lose, or draw.

There are hundreds of industries in Detroit, large and small, which owe their existence to the daring, "do it

now even if you have never seen it done" technique of the motor industry, although many are now engaged in other lines.

Any city or locality which does not possess the priceless things Detroit has in abundance—skilled and varied production factories, run by management with imagination, vision and enthusiasm—will have difficulty establishing itself as a center in the postwar aviation industry. Detroit is that logical center. During the depression, Detroit let slip its great chance to become such a center. It should regain its losses.

Many of the early accessory firms grew into tremendous and successful businesses and are still supplying products to car makers. However, the tendency of the latter to make their own parts increasingly began to assert itself before 1920 when many car builders discovered an advantage in producing some unit formerly supplied by a specialty organization.

Pioneers in parts and accessories had the same financial problems as did the so-called motor car manufacturers or assemblers. The parts people, in addition to their engineering and manufacturing problems, had the difficult job of securing proper metals and materials. They also encountered the same lethargic interest among Eastern bankers as did the infant motor industry. They were new and the product they proposed making was new, and then—as now—anything untried and different met resistance.

For the most part, Detroit bankers were willing to take chances. This is understandable inasmuch as they were nearer the center of enthusiasm and better able to visualize and assess the various propositions brought to them. Also, the Detroit bankers were able to assess the men who were heading up these new enterprises. They followed the good old banking rule of basing credit chiefly on character and past reputation of men comprising the

various groups who applied for loans.

Let it be said that such bankers as Alex McPherson, of the Old Detroit National; William Livingstone, of the Dime Bank and John Thomas Shaw of the First National Bank, and others, formed a group which used the long telescope and saw transportation of the future in the baby industry. They and a few others bankers made some loans which I doubt could be obtained today even from some of our progressive bankers. Lines of credit were given firms owning sufficient capital assets, such as property and machinery, and manned by men of good reputation and some experience in the science they were then pioneering, insofar as it had to do with the mechanical arts of working with and handling of similar materials.

The parts makers had other troubles. As I said before, each motor car assembler of the very early period attempted to make and market a fairly large, high-priced car on the theory that the rich or luxury class would comprise the only possible market. Therefore, the component parts makers were unable to adopt any particular classification or standardization of units until the classifications as to price range settled somewhat in the brackets of from $1,250 to $2,000—with emphasis on the in between prices of $1,500 to $1,750. This came after the year 1910. Then, both the makers and the public seemed to fancy cars priced from $2,250 to $2,750—and sized according to price. All cars above $2,750 were clearly and distinctly classified as luxuries for the rich.

Component parts makers of engines, axles, transmissions and other accessories began to standardize combinations within these classifications, based on horsepower and weight of the different types of cars. The parts makers early began seeking through research new and better metals and materials which would be stronger and lighter. Substitution of forgings for various types of castings required new and lighter steels.

Until about 1905, steel makers were definitely certain that they had explored their field completely and that nothing more could be learned about the making of steel. This, of course, was a fallacy. Harold Wills, Ford Motor Company engineer, was among the first to uncover different alloys. The introduction and use of nickel-steel enabled Ford to reduce many parts of his car into smaller, lighter and stronger sections. After that discovery, steel making entered a new phase. The motor car must be given credit for shaking the steel industry out of its long sleep.

THE RESEARCH TRAIL BEGINS

With the lighter and strengthened steel more or less classified and standardized, types of motors, axles, tires, and other parts were made possible. Thereafter, newly formed companies of motor car assemblers designed models to come within range of these standardized specifications as to type and size. This reversed the outmoded practice of the parts maker who attempted to make working units to fit varied engineering ideas.

Take a look at some of the essential parts and units that make today's modern motor car practically foolproof. Each of these units has given birth to vast industries, many of which have far-flung plants and branches in the various states of this country and in Canada and Europe. They constitute a huge industrial empire, drawing impressively on the materials and labor markets of the world.

I intend to mention and comment on the development and present-day status of some of these essential parts and units and the industries they have created, such as motors, frames, wheels, carbureters, batteries, spark plugs, axles, springs, steering gears, bodies, ball and roller bearings, transmissions, radiators, ignition systems, tires, paints, varnishes, etc.

To the layman or indeed to anyone not having first-hand contact with the early development of the motor car, the preceding paragraph might appear to be dry. A moment's reflection and review of the great firms manufacturing all of these parts will present another reason, if reason is needed, why the building of the motor car and its parts has done more in a few brief years dramatically to bring research and mass production methods into industry generally.

Of all the units in a motor car chassis probably the motor and the rear axle have more distinct, separate parts than the other mechanical units. There are thousands of pieces in each of these constructions, many of them requiring a great many different operations. In the pioneer days this last fact accounted for much financial, material and labor loss in production. Many pieces would undergo a painstaking series of operations only to be spoiled on the last one.

The Automobile Trade Directory of 1906 listed 68 firms making gasoline motors available to the trade; 17 making steam engines, and 23 making electric motors. The three kinds of power were all being used at that time and all were being built for prospective car makers or assemblers. Most of these firms were in the Middle West, a number of them being still in business as this is written.

The Directory of August 1946 listed nine firms making gasoline motors for the trade, one making electric motors, and none making steam engines. Some of the present-day firms make motors exclusively for trucks, taxi cabs and busses. A number of them have developed large, prosperous businesses.

It is a far cry from the first single cylinder, internal combustion motor to the sleek, sturdy, high-powered, smooth-running motor to be found in any good car today. I flew in one of the Wright Brothers' earliest creations. It was constructed of silk and bamboo and had a motor

weighing 29 pounds per horsepower. Today's planes are powered by motors delivering one horsepower for every 16 ounces of weight.

When the early experimenters finished playing with steam as a motive power most of them began building gasoline engines. Practically all of the earliest cars had single cylinder gasoline motors.

After that came the two cylinder motor. Some of these were parallel with the frame, mounted amidships, and using chain drive application of power. Others, as was Charley King's "Northern," described earlier, had a double opposed, two cylinder motor, transversely across the frame at the front end, the power application being by means of shaft drive and beveled gears.

What the motive power of cars and trucks of the future will be is highly speculative.

It is certain that the gasoline engine as developed by the motor car industry gave the needed lift and wallop to American air power during the war. We produced lighter, more powerful and effective motors than any of our enemies.

The particular applications we made of the super-charger taught us a lot. The super-charger is more like the gas turbine and turbo-jet engine. The turbine wheel makes use of the same power method. It is spun by combusted gas.

The problem of making tough alloy steels that will take the temperatures and stand centrifugal force is being rapidly developed. Some believe that within a decade the reciprocating engine will be relegated to second place. Just what this new form of motor, which is lighter, cheaper to build and greater in horsepower, will mean to motor car design, the public generally does not know, although some far-seeing engineers in laboratories and on drafting boards may now have the completed picture.

There were 21 firms manufacturing complete sets of

axles in 1906. Some used ball bearings and others roller bearings. The earliest motor cars were driven with a single chain over a sprocket on the rear axle. Some cars used double chain drive, one on each side. Friction drive on cars had a short vogue, such as the Cartercar, with one vertical revolving disc, its flat edge moving in or out against the flat surface of a larger vertical revolving disc, these motions producing either slow or high speeds.

AXLE MAKERS MEET PROBLEMS

Then came the beveled gear shaft drive. Many old timers have vivid memories of driving along dusty roads or coasting down a hill and wondering why the car was running so smoothly, only to find when it came to a complete stop that the chain was missing. If this happened at night it was all the more interesting, but if one retraced every foot of the dusty road the chain could be found, sometimes in pieces. The next step was only the small matter of having enough cotter pins and extra links to restore the chain to its proper length. The shaft drive axle removed all these troubles.

Then came the helical bevel gear, very much in use today. The worm-drive gear is used on larger and heavier trucks and buses.

In front axle construction, Ackerman, in 1818, proposed and patented the idea of steering by means of stub axles swivelling on the ends of a fixed axle. Both wheels turned the same number of degrees—which was bad geometry. This was later corrected by arranging the steering arms so that the wheel following the outer curve would roll on a larger circle. It is said the first to apply this principle to a solid axle was Charles Jeantaud, a Frenchman.

In this country, the principle of fitting yokes on the ends of tubular axles, then fitting into these yokes the knuckles and spindles to receive the wheels was patented

in 1887 by Sterling Elliott. He used such an outfit on a four-wheel rubber-tired quadricycle of his own construction. This was a simple and yet perfect invention, removing one more of the early problems the buyers would have had to overcome, and providing a method by which they could steer cars around corners. Motor cars had to be fitted with nonturning front axles; therefore, they had to be fitted with wheels that could be turned at the right radius on a stationary axle.

In 1946, seven concerns were still making complete axle sets, many of them specializing on truck and bus axles. There are also several firms making units for both rear and front axle construction, including four-wheel drive and two-speed trailer axles.

Prior to the time we established the Timken-Detroit Axle Company in Detroit, I was in that city on one of my frequent visits. I had the tipoff that Ben and Frank Briscoe were about to bring out a new light car. I hurried out to their plant on Woodward Avenue and had a talk with Ben. He admitted that he and his brother were planning to bring out the new car, although they were not ready to talk about it publicly. I told him we wanted to get in on the axle job and would submit bids as soon as he was ready to give us blueprints and specifications. He said, "You'll have to go lower than you have ever gone in your life if you want this job." I gave him the usual sales talk and he finally laughed and told me, "You will have to bid lower than 96 cents per set if you get this job." It might be mentioned that, at that time, a set of axles ran anywhere from $100 to $200 per set.

Most old timers will remember that when the new car came out it had two *wooden* axles with four coil springs, one in each corner. I think Al and Bill Brush, who were prominent engineers of the time, and still are, were responsible for that and many other designs.

I remember an instance in the early days in Auburn,

Indiana, where the Eckert Brothers were assembling a car they called the "Auburn"—which later became well known. They wanted to buy much smaller axles than I thought they should have. I believe they claimed the car would weigh approximately 2600 pounds. It was in the first assembly stage at the time. The study of blueprints and specifications, showing the long wheelbase, convinced me the car would weigh a great deal more than estimated. I wanted them to use proper size axles on the Auburn job, with the view of lessening the burden of complaints. These complaints were continually coming in and were concerned chiefly with broken axle shafts and knuckles, mostly due to overload and overpower.

I could not get them to give me the exact weight of the car, so I took the order for a size axle which I felt to be ample for a 4000-pound car. Then I bet each of the brothers 100 Havana cigars that the car would weight at least 4600 pounds. I made the poundage sufficiently high so that I would be sure to lose. We wanted proof of the actual weight of the car when completed.

The majority of builders at the time never weighed their first models. I was present when the "Auburn" was finished, and we drove to the city scales and weighed it. I nearly won the bet I did not want to win. The car weighed 4400 pounds, as I recall it.

Such incidents produced data and information leading to refinements and other changes that would more completely balance the car.

POWER TRANSMISSION IMPROVES

A number of firms are producing transmissions of various types for the trade generally; that is to say, for passenger cars, trucks and busses. There are "Fluid Drive," "Variable Speed," and "Hydromatic." Still other combinations of transmission and clutch under different

tradenames are: "Over-Drive," "Vari-Pitch," "Selecto-Speed," and "Change-Master."

In the parts connecting transmissions to rear axles there are dozens of pieces used in making universal joints and propeller drive shafts.

* * *

Frames for early cars were crude indeed, in design and method of production, as compared with today's output. As a matter of fact, some firms began by using wood frames with forged steel trimmings. The Franklin "air-cooled" car continued using hickory frames for resiliency for a great many years.

Pressed steel frames require large and heavy machinery and presses. In 1906, there were seven firms supplying the trade with that product. In 1946, there were four large firms still active.

* * *

Suppliers of springs did not have as many problems in meeting the demands of the motor car, having had the advantage of years of experience in making their product for buggies, wagons and horse-drawn trucks. The problem of making suitable springs for motor cars and trucks consisted, chiefly, of taking advantage of new steel formulas, tempering, etc., as the steel makers in trying to comply with demands of motor builders for different, lighter and stronger steels, were beginning to apply more intensive research into the requirements of this new industry. In 1906, there were 22 firms making springs for the assembly trade. In 1924 there were 29 firms. Trucks, busses, and trailers have added materially to the demand for special spring construction.

* * *

In 1906 there were 16 firms making radiators for the trade. In 1907, the number had increased to 22. In 1910, there were 25 firms and by 1914 there were 29 firms. In

1946, 13 firms remained, all doing a very profitable volume business.

* * *

At the start of the industry, practically all motor cars were equipped with wooden wheels. As the volume of production of cars increased a heavy demand was created for second-growth hickory.

Most car models from 1900 to 1910, used from 1⅛ to 1¼ inch, to 1½ and 1¾ inch size spokes. A number of large wheel concerns bought lumber tracts and established mills at such points, in order to control their supply in quantity and quality. Good wood grain was highly essential, since the wood in the spokes was apt to shrink, making for loose hubs and joints.

The wheel business brought a great demand for rims. At the start there was but one type of rim—the one-piece clincher type. Early motorists have vivid recollections of trying to get a 31½ inch tire casing onto a 32 inch rim. Tires, of course, were not made as accurately as today, so that it required all the tools in the box and, usually, a couple of men to get those non-elastic casings over those clincher rims.

Prior to 1910, the wire spoke wheel appeared. It had many advocates but for the man who serviced his own car it was not the easiest thing in the world to clean. The meshing and crossing of wire spokes furnished a splendid resting-place for clay that could be picked up on most of the roads.

Then came the pressed steel solid disc wheel. By 1946, there were four firms manufacturing disc wheels; six firms making the dual-pneumatic and two, steel spoke wheels.

* * *

The early motor car assembler made up his steering gear unit by purchasing different parts, such as wood rims, tubing, shafts, gears, etc., from a dozen different

firms, which he assembled into a complete unit. In 1946, the complete steering gear assemblies, ready to install in cars, trucks, and busses, were being produced by three firms, all successful, large manufacturers.

* * *

The ignition system of early cars probably assisted more than anything else the development of the so-called "experts" in motor tinkering. The early models had the coil and "commutator" right on the dash where the lid could be easily unhooked and the "expert" go to work.

It seemed to be an attractive field for many experimenting companies. Here again, many parts of the ignition system were made by different concerns and sold to assemblers, separately. However, there were 19 firms making complete ignition systems in 1906.

One cannot think of those early ignition systems without remembering Charlie Splitdorf. He was certainly a "good time Charlie," well-known to everybody from coast to coast who had anything to do with the industry.

In 1946 there were five large firms supplying the ignition requirements of cars, trucks, and busses.

The magneto made its appearance in this country early after having been exploited and developed to a large extent in Europe. By 1908-1909 it had practically eliminated the storage battery for ignition purposes.

* * *

The carbureter, another important unit in the successful operation of a motor car, had its birth-pains in the early days. Or, should we say, the manufacturers of carbureters, like the makers of other parts, had the birth-pains while trying to keep up with a rapidly developing business which had not had time to settle into any particular standards as to type, size and weight of cars. It is a far cry from the gas flame hot tube, used in exploding gas in the early gas engine, to the modern carbureter with its multiplicity of parts and fine workmanship.

It frequently became necessary to take the carbureter apart on the road, miles from anywhere, so, another "expert" came into being as a result of tinkering with carbureters in the early cars. He really got to be quite a fellow, with his professional air and offer of assistance on the road. Those were the happy days when everybody helped everybody else, whether or not they knew anything about motors. If the other fellow seemed to know less, then the "expert" had a field day

"CATCH 'EM YOUNG AND TRAIN 'EM"

The old saying, "catch them young and train them," was the rule in many of the early companies formed for manufacturing car parts for the assemblers. Many of these companies were formed by young men. For instance, the Holley Carbureter Company, organized and developed by the Holley brothers, George and Earl. They are one of the outstanding examples of the part played by young men in developing the motor car and exemplify the type attracted to the industry. It is a business that has always appealed to young men. The Holley brothers started early in experimentation, and their energy and efforts resulted in the Holley Carbureter Company.

When George and Earl Holley began experimenting at Bradford, Pennsylvania, about 1899, neither one was old enough to vote. At that early date, they imported from France the Longuemare carbureter. They experimented with this over a period of time, attaching it to a motor-bike—now called a motorcycle. Subsequently, they secured the United States agency for this carbureter and made 200 or 300 motor-bikes.

About 1903, they made a four-wheeler car with a one-cylinder upright engine, which they called the "Motorette." Incidentally, the design of this motor and rights of manufacture, were later sold to the Standard

Wheel Company of Terre Haute, Indiana, from which came the little Overland car, later made at Indianapolis.

They made approximately 100 of these "Motorettes" and sold them.

Among their very early customers was the Crestmobile and the E. R. Thomas Company, of Buffalo; also the George N. Pierce Company, of Buffalo, a successful builder of high-grade bicycles. The Pierce Company began to experiment with motor cars about 1905. The first model was called the Pierce-Stanhope, fitted with a 5-horsepower single cylinder French deDion motor, which was mounted on the rear axle. Old timers will remember seeing some of these high surrey buggy-type vehicles.

To more thoroughly demonstrate his company's carbureter as applied to its motor-bike, young George Holley attended the Pan-American Exposition, in Buffalo, entered and rode his motor-bike in the races and established some of the early records.

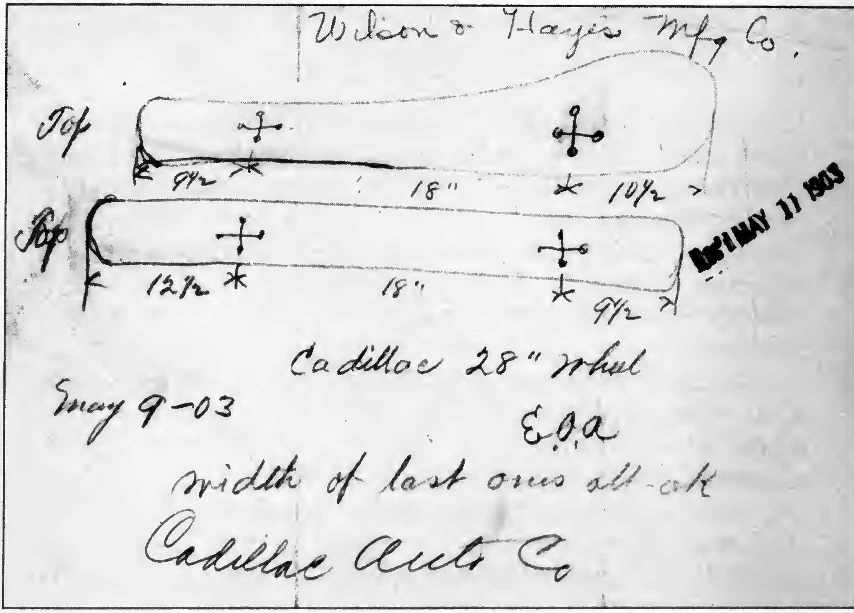
The latter part of 1904, George Holley came to Detroit, interested the Olds Motor Works in the Holley carbureter. At the instance of Olds' chief engineer (the late Howard E. Coffin), Walter Morely, purchasing agent, gave the Holley brothers their first "big" order—for 25 Holley carbureters. This was considered a large order at that time. It was for a little two-cylinder opposed type of motor to be used in a car which Olds brought out in 1905.

As business was centered in Detroit, the Holleys, as did many others, came here to handle production more efficiently and to keep pace with the baby industry, then beginning to grow. They set up shop in the Michigan Lubricator Company, where their carbureters were produced until 1910 or 1911, when they rented a factory on the East side. They later purchased land and built their modern plant with its numerous additions which they now occupy on Vancouver Avenue.

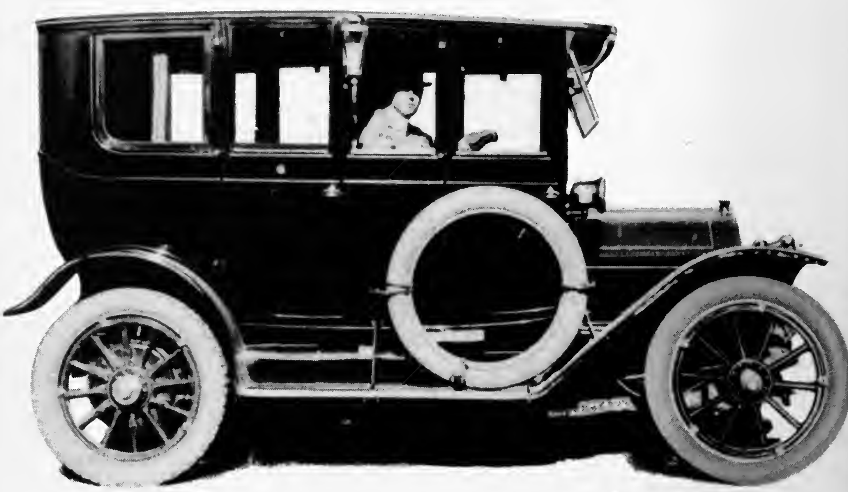
Among their early customers were Henry Ford and Alexander Winton. Here is another example of Henry Ford's interest in young men. Mr. Ford was attracted by the enthusiasm and genius of the Holley brothers and not only gave them orders but every kind of help and encouragement in designing, improving and manufacturing their carbureters. His assistance and interest were invaluable.

In addition to making carbureters for various motor car companies, the Holley Carbureter Company also specializes in carbureters for aircraft of various types. Their war work was extensive and invaluable.

Among the prominent carbureter manufacturers of the early days were the Stromberg, Rayfield, Kingston, Marvel, Zenith, Shebler and others.



PENCIL DRAWING OF FENDERS



FIRST CLOSED BODY BY FISHER

Crude drawing of Cadillac fenders (1903) and the Author in the first closed body made by Fisher Brothers. This was all hand work.

CHAPTER 25

The Great Auto Body Makers Followed Romantic Path

The building of automobile bodies at the turn of the century was a complicated business. There was no standardization in type, size or style. Some of the early cars were solely of the runabout type, some with "do-se-do" seats, meaning that the two passengers in the rear had their backs to the two passengers in the front seat. Then there was a rear entrance tonneau body, sometimes with a small seat on the rear door for an extra passenger, who often was unlucky when the latch on the door let go.

In the Automobile Directory for 1906, there were 86 firms listed as making various types of bodies required by the industry at that time. Some of these were making a few bodies for commercial cars and trucks. In the 1946 Directory, there were only three or four concerns making passenger car bodies, and they were principally for cars produced by the few large manufacturers.

The modern pressed steel body is produced in volume in large plants covering extensive areas with expensive presses and machinery. Like every other operation in the modern motor car it is a mass production line-assembly product.

When one starts to think about car bodies, the name of Fisher leaps immediately to mind. No story of the automobile could be written without considerable mention of the Fisher brothers—and properly so. Their story is a fabulous one. From time to time, parts of it have been published—and still it is glamorous and dramatic.

Their grandfather was a wheelright and blacksmith

in Peru, Huron County, Ohio. One of his sons, Lawrence, followed his father's trade and set up as a wheelright and carriage builder in Norwalk, Ohio. His brother, Andrew, worked with him, as blacksmith.

The late Fred J. Fisher was the oldest son of Lawrence and as soon as he completed the eighth grade his father put him to work at the bench.

Charles T., second son of Lawrence, served his apprenticeship there.

The six Fisher brothers known to the modern automobile and financial world, are: Fred J., Charles T., Lawrence P., Edward F., William A., and Alfred J.

At twenty-four, Fred J. Fisher came to Detroit and secured a job in the drafting room of a carriage factory. For several years thereafter, he periodically returned to his old home in Norwalk, Ohio, for a month or two, to help his father in the carriage plant.

In 1908, Fred J., and Charles T., organized the Fisher Body Corporation, with a capital of $50,000. The other brothers subsequently joined and were taken into partnership as quickly as they came of age.

They began making carriage bodies, but were quick to see that the motor car would soon supplant the horse-drawn vehicle and that it was apt to grow immensely. The brothers all worked—arriving early in the morning and were the last to leave at night.

As the first car bodies were made of wood, each of the brothers was schooled in cruising timber, judging and selecting the proper quality. They served time in the wood-cutting departments and particularly in the purchasing and material divisions. From there on, they went into processing and actual work on bodies until the job was completed.

I believe it was 1907 or 1908 that the idea of a closed body for a motor car began to command attention. On one of my visits to the Cadillac Motor Car Company,

about that time, I found Mr. Henry Leland and his engineers examining a coupe body that had been made by Parry, in Indianapolis. Mr. Leland said they had finished their inspection and I asked him if the body could be fitted onto a chassis of a new four-cylinder Cadillac car which they were just bringing out. I bought the body which they fitted to the chassis. It had a large plate glass windshield with about three-quarter inch of bevel all around its edges—which proved to be a wonderful idea to guarantee reflection and other fierce lights into the driver's eyes.

The frame and inside trim were of light mahogany. There was plenty of glass all around, and that developed the first opposition to the closed body. Motor car bodies, until that time, were of the folding top type with long forward straps holding the top in place. These were hooked into the front end of the frame, on each side of the radiator. There were also a series of folding side curtains with mica panels for windows, and buttons for fastening, so the interior could be closed off from the weather, after a fashion. One usually did not put on this miscellaneous lot of curtains when it just *looked* as though it might rain, as many times it proved to be an unnecessary job. So when it did start to rain, all the passengers had to get out of the rear compartment and stand in the rain while the rear cushion seat was taken out and all these mica curtains retrieved from their hiding place. Then, all you and your friends had to do was to attach these curtains at the various points by fitting them over turn buttons which in many cases were not located to fit their openings.

The fear of injury from flying glass in case of collision or other accident soon disappeared and the promised comfort of enclosed driving in all weather made an appeal to the early car owner.

In early 1910, while in the Fisher brothers' office, at

their enlarged plant on Piquette Street, we were discussing the possibilities of closed bodies. Louis Mendelssohn was their financial man at that time. The Fishers had been supplying open bodies to most of the trade, just as the Timken Company had been supplying axles. There was a great deal of mortality among those early motor car assembling companies, with the result that Fisher and Timken, along with engine manufacturers and other makers of parts, sought to salvage their accounts through a committee of the Motor and Accessory Association. I was a member of that committee and hence in more or less close contact with the Fishers and their body-building enterprise.

I told the Fishers I had bought another car and would like to have a closed sedan body on it. They undertook the job, and I am quite sure it was the first closed body the Fishers ever made.

They had a large blackboard at one end of the room where the complete picture of the body was drawn to scale on top of the chassis, the measurements of which were supplied in detail. We would sit in front of that blackboard drawing and, as suggestions and corrections were made, chalk lines would be erased and new ones put in until the general idea in appearance and design was satisfactory.

FIRST CLOSED BODY HAND-MADE

The process of making the body was long and tedious, especially with its multiple operations of pumicing, rubbing and applying the numerous coats of paint. That body may not have been the best-looking body ever made by the Fisher brothers but they never made a better one. It was in use for years and finally when I sold the car, there was not a squeak or crack in the body.

During the process of construction, I dropped in from time to time and would go out into the plant to see

how the job was coming along. On one such occasion, Fred took me to one of the top floors where the body was in one of the later stages of operation. It was being pumiced and rubbed with cold water by a couple of fellows in shorts and undershirts. They said, "Hello, there!" to Fred, and talked awhile. Then, as we moved away, Fred asked, "Do you know who those fellows are?" and continued, "They are two of my brothers. That's the way we all learn the business."

With that sort of background and training, the story of the success of Fisher Bodies is told. In later years it has been boldly stated that if there had not been a Fisher Body Company it is questionable whether there could have been a General Motors Corporation.

The activities of the Fishers have always been news and stories have appeared frequently in the press throughout the years. They are a close-knit family, always counselling together on their general business affairs, as well as the individual affairs of each. The advice and counsel of their mother were highly regarded and followed by all the brothers. In the early years of their careers she had expressed the wish and hope that they would always remain together in their business operations.

The Fishers, after having refused several offers to sell to General Motors, finally made an arrangement whereby they supplied all General Motors bodies, in addition to any open trade contracts they might choose to take, and agreed to dispose of their holdings to General Motors for $208,000,000.

The Fisher Company, Inc., was then organized and has been most successful in its financial operations. Their holdings in various basic enterprises are well placed and remunerative.

The final termination of the Fishers as directors and officers of General Motors Corporation occured when they resigned in 1944.

The Fishers, individually, have always been averse to the spotlight. This is not a matter of mock modesty but rather a feeling that it is just good business prudence.

At this time, there are not many people around who know how the early bodies were made. It was a long and tedious process. I remember seeing them made in many of the larger plants, particularly for such high-priced cars as the Peerless and the Royal of Cleveland.

The "tonneau" bodies, such as were built at one time, had what appeared to be a double curve around the rear seat. From side door to the back and to the opposite side door was all one piece. It was made by glueing together strips of poplar wood about one inch square. These were cemented or glued together one upon the other, covered on both sides with a heavy open mesh muslin fabric which was shellacked into place. Then, huge bending forms were used, with high steam pressure, to get the desired curves and bends. This took a great deal of time and patience.

Then the laborious process of rubbing down and finishing began. Most of the bodies had more than thirty coats applied. All told it took eight or nine weeks and sometimes longer to complete a body.

Contrast those methods with the practice of the present days: stamping out the body in one operation, then applying the finish, using spray machines, followed by the process of drying paint from the inside out, in quick-drying ovens, the whole job being completed in a few hours.

Fred Wadsworth was one of the early makers of wood bodies. I will never forget the look of anguish on his face when a team of horses, attached to a heavy truck, slid out of a line back of the Detroit Club and pushed the wagon tongue right through the back of one of those expensive, hand-made bodies. The cracking of the woodwork and the destruction of the entire rear part of the tonneau,

brought vividly to Fred's mind the weeks of laborious effort and cost involved in the replacement.

After wood was replaced by steel, Briggs, Fisher Body, Murray Body, Budd and a few other companies quickly became leaders.

BRIGGS GAINED TOP THE HARD WAY

THE NAME OF Walter O. Briggs, Sr., belongs in the list of automobile pioneers and men whose genius and perseverance have contributed largely to Detroit's industrial fame. He is the founder and present Chairman of the Briggs Manufacturing Company, one of the great body concerns of the world. The company also operates a large plant manufacturing sanitary plumbing equipment. Baseball is simply a hobby with Briggs—a hobby which, incidentally requires huge sums of money to indulge.

Briggs attributes his success mainly to his meticulous attention to business and his carful selection of people and companies with which he deals. This wise policy came about, strangely enough, because of the operations of a thief. His first job was crating baskets in Ypsilanti, Michigan, where he was born. He was fourteen years old. A sub-contractor absconded with all the pay checks. Since that time Briggs has double and triple checked every person with whom he has signed a contract.

In 1891, he became a car checker with the Michigan Central Railroad, in time working his way up to foreman of the car shops. He went to work in 1903 as foreman of the body works of the C. H. Little Company, a paint and trim shop. In 1904, B. F. Everitt offered him the general managership of the Everitt plant and he left the Little company.

The company bearing his name was organized in 1909. From that time until 1941, Briggs Manufacturing

Company produced all Ford bodies. It developed such bodies as the coach for Hudson, the first high production closed car; the Zephyr for Lincoln and the Clipper for Packard. In 1929, Briggs Motor Bodies, Ltd., erected a plant in Dagenham, Essex, England, to produce Ford bodies for that country and the Continent.

Briggs is the owner of Briggs Stadium and the Detroit *Tigers*. He has been much in the spotlight of late years as Detroit's foremost sportsman, and because of his lavish expenditures on building his justly famed team and his guidance of it toward several American League pennants and world championships. This pleasant publicity has, to a certain extent, overshadowed his real life's work—the building of fine automobile bodies. Baseball is just a hobby with Briggs and, although he may be seen in his Briggs Stadium box almost every bright summer day the *Tigers* are at home, he is still the active Chairman of the Briggs Manufacturing Company.

However, sideline as it is to Briggs, the Detroit Baseball Club has been enormously beneficial to Detroit, both financially and in prestige. Detroit is considered the best "baseball town" in the country. The Detroit *Tigers* draw thousands of visitors from the country and nearby towns and cities, with the consequent visitor-spending. In addition, Briggs' team is one of Detroits' great prides. The credit for the *Tiger's* present success, prestige and popularity is due to Walter O. Briggs.

* * *

H. Jay Hayes has, I believe, the distinction of having made the first steel body for an automobile. This job was accomplished by his firm—Wilson and Hayes Manufacturing Company of Cleveland, Ohio—in 1899. The steel body was mounted on a three-wheel automobile of a sort, propelled by an electric motor with batteries provided by Willard.

In 1900, Jay made a new body on a four-wheel chassis, all steel and with removable panels. It was so built that by the insertion of new panels the body design might be changed. The car was propelled by steam and, as steam cars had a habit of burning, steel was necessary. It was made by the Eastman Company of Cleveland.

The Eastman car had no lighting facilities beyond an ordinary lantern attached to the patent leather dashboard, and a pair of oil carriage lamps mounted on each side.

The father of Don McLouth of McLouth Steel Company was secretary of the Eastman Company.

Hayes is said to have made a metal body for a curved dash Oldsmobile at the Cleveland branch in January, 1902. He also has the rough pencil drawing for a set of metal fenders made by his firm for the Cadillac Company, in May 1903, a photostat of which is reproduced in this book.

Hayes came to Detroit in 1903 and opened a shop employing ten men. By 1910, he had 1400 employees making steel bodies.

He is now retired.

* * *

The building of commercial car bodies has grown into a huge industry. There are a number of large companies making dump bodies in varying quantity for many uses and purposes.

The trailer body business has also grown tremendously, within recent years. There are eighty-five firms advertising trailers of various types. The growth of the Fruehauf Trailer Company is indicative of the general widespread use of trailers pulled by tractor power units, either diesel or gasoline, for heavy and continuous transport of bulk products.

The Fruehauf Company has a network of branches and service stations in many cities and areas throughout

the United States. Its business, like component parts makers and automobile companies, sprang from a small beginning. It began as a blacksmithing shop, producing a small single box trailer mounted on a single axle with one pair of wheels, to be coupled on to the rear of a passenger car. Many of these small trailers are in use today.

It is not the intent or purpose of this writer to deal with the great truck-making industry, as that would make a fair-sized book of itself. Mention should be made, however, of the wonderful development in production of the great variety of large, specialized steel trailers made to fit the transportation of every type of product. These include glass-lined trailers for transporting such things as milk, oil, chemicals and other liquids.

The three Fruehauf brothers, Harvey, Harry, and Roy, supply progressive, efficient sales and administrative management for their big and still growing concern.

* * *

The storage battery, one of the most important requisites of motor car assembly, is just as essential today as at the beginning of the industry, and the story of its development leads over the same tortuous experimental road as was traveled by all other parts makers.

All the early motor cars were equipped with a so-called "sparking" battery. The first stock models of the Cadillac began to appear in 1911, equipped with self-starters. From then the battery business entered a new and different phase.

The first electric starter equipped cars carried a 12-volt battery. Plates of the Plante type could not be used successfully, and early experimenting was done to produce an improvement of the so-called Faure or pasted plate type. The ignition batteries used were of the six-volt Autex type.

When the magneto came along the battery people began to explore completely the possibilities of electric

lighting for motor cars. Old timers will recall that lighting until then had been accomplished by using acetylene gas in a tank, usually attached to the runningboard. Many will remember Carl Fisher's Prest-O-Lite system.

The change to electric lighting involved much experimentation in car lamps. Early experiments were carried on with lamps imported from France. The lighting problem was greatly simplified when the Mazda lamp appeared.

The recharging of batteries at short periods was, of course, a problem. I think Willard was one of the early producers of a suitable generator for cars. In making the generator adaptable for this use, much had to be accomplished in solving the problems of capacity, weight, size, and price.

With a generator installed on the car to keep the lighting battery full, it was an easy step to an electric motor drawing its power from the same battery to operate the self-starter for starting the motor.

An illustration is shown in this book of a three-wheel car with a steel body. The electric power was furnished by a Willard battery. This was one of the first applications of this kind.

CHAPTER 26

A Dentist Becomes a Geologist; Spark Plug Gets New Spot

The spark plug is probably one of the smallest working parts of a motor car and one of the most important. If there were no spark plugs there would be no explosion in the internal combustion motors of the cars, trucks, planes, busses or yachts. Before 1907, this part, as were many other accessories, was imported from Europe. The Stranahan brothers were not impressed with the imported plugs, any more than the Holley brothers were with the foreign carbureters, and, as the Holleys made a better carbureter, the Stranahans tried to make a better spark plug—and succeeded.

John Willys induced the Stranahan brothers to move their shop to Toledo, from which point their plants have spread to several cities. These brothers began business in a loft of a laundry in Boston. When they moved to Toledo they leased the second floor of a small factory building.

The story of the spark plug, as developed by various energetic young men with vision and imagination, who were engaged in experimenting on different parts and units to be used in motor cars all over the country, is identical with the struggle of many to reach the standard of perfection which has been universally achieved in all of the parts of the modern motor car.

The first spark plugs were crude affairs made of wet clay of varied ores. The problem of getting material to resist high compression and great heat bothered the experimenters for a long time. Strangely enough, one of

the greatest contributions to the improvement of the spark plug was made by a dentist—Dr. Jeffery—who was interested in porcelain and was also an instructor in metallurgy in California.

To meet the needs of World War I, the United States Bureau of Standards developed a spark plug with cores that would stand higher temperatures. It found that the plugs needed crystals of sillimanite in the porcelain, but there was not any sillimanite.

The following, given to me by the Champion Spark Plug Company, is, I believe interesting:

"True, a few small crystals had been found, but only enough to prove that such stuff did exist—and it was in museums. So, the Bureau made artificial sillimanite, which was very, very expensive. Dr. Jeffery wondered if nature had perhaps hidden some of the ore somewhere, where once there had been high pressure and high temperature. Geologists smiled and thought Dr. Jeffery was dreaming.

"He was not exactly dreaming. He was thinking. He was thinking of a section of California which had probably once been subjected to volcanic disturbances. He went there twice and found nothing. He went a third time. At the end of a fruitless day, Dr. Jeffery and his companion were clearing off a shelf on a cliff to make a sleeping place, when Jeffery lifted a rock to hurl it over the precipice. The rock was unusually heavy. He was curious, but it was too dark to get a good look, so he put it aside until the next morning. The rock was about the size of the palm of a man's hand. It was sillimanite.

"The next day, Dr. Jeffrey traced that rock to a spot six thousand feet above the floor of the canyon, on the side of a bald mountain rock and there was found the only commercial sillimanite deposit in the world."

Sillimanite is reduced to a powdery form so fine that it will pass through a mesh containing 105,000 holes to

the square inch. The powder is fed into molds and subjected to 5,000 pounds of pressure, then shaped into insulator blanks before they are glazed. Then they are kiln-fired at a temperature of 2600 degrees, this process taking seventy-two hours.

There are a number of successful firms manufacturing spark plugs today. Many of them, of course, had the same problems in developing as was experienced by the Stranahan brothers.

* * *

One of the tough problems confronting the early producers of motor cars was that of overcoming friction in moving parts. The makers of lubricating oils have progressed tremendously in the refinement and production of various kinds for different uses in the mechanical parts of the car. The story of their research and its development to the high standards of the present day, makes an interesting chapter parallel with the pioneering of all other parts and materials as used in the production and operation of the motor car.

* * *

Lubrication reduces friction but at points in the car where loads are carried, where high power is applied and where thrusts must be taken, anti-friction bearings began to take their place.

The cars produced by many of the pioneers used plain friction-bearing surfaces in engine crankshafts, transmissions and axles. For instance, in the case of axles, axle spindles were brought to a fine, tapering finish and the interior of the hub, mounted in the wheels, was finished in like manner.

It is evident to the layman that such mountings, where power and weight are applied simultaneously, required the high development attained in the production of roller and ball bearings and materially added to his satisfactory driving, in the ease and flexibility of handling his car,

quick starting, smooth running and long life of all those essential parts where anti-friction bearings are now used.

Here again, romance verging on the dramatic is present in the vigorous and intense laboratory studies made by the good old "trial and error" method in producing, treating and finishing of steels to fine limits used in bearing parts, as found in the modern motor car.

The directory of 1906 listed about twelve firms making ball bearings and ten firms making roller bearings. The directory for 1946 lists about fourteen manufacturers supplying ball bearings and about thirteen supplying roller bearings for motor cars and heavy-duty trucks.

The ball bearing is another part which in the very early days was imported from Europe. Some of those importations were infinitely better than anything we could make here at the time and, today, some of the importations rank with the highest of their type in skill and finish in workmanship.

CHAPTER 27

"Boss Ket" Has the Right Answers—Starter, Ethyl Gas, Body Finish

For almost forty years the name of Charles F. Kettering has sparkled in the pages of world research and inventive history—and whenever the listings of the automotive industry's great men are made "Boss Ket's" name will be high on the list. It does not appear among the pioneers who built early experimental cars and later became builders of motor cars in volume, but no motor car story is complete without full credit to Kettering for his many contributions to the industry. Possessed of a penetrating and inquisitive mind which sees an incompleteness in every man-made thing, opportunity for improvement regardless of seeming perfection, Kettering is recognized to be one of the greatest research engineers in the world.

One wonders just how far advanced the automobile industry would be today had not Kettering produced the electric starter in 1910. It is true that someone else would have invented a similar gadget but Kettering's starter was a success from the beginning and years were probably saved. Other starters, both mechanical and air, had been tried, but these were soon abandoned as inefficient. Certainly his invention broadened the scale of immediate usefulness and pleasure of the automobile. Tens of thousands of women—and men too for that matter—who would not risk using the hazardous handcrank became motor enthusiasts years before they would have without Kettering's invention.

The story has been told, but bears repeating, of how Kettering as a result of a talk with Henry M. Leland

secured a Cadillac engine, bought various attachments and gadgets from here and there and began to experiment on the possibility of starting a gasoline engine by electrical power. These experiments covered a long time. He had to figure out the gear reductions requisite to the varying horsepower, and many other difficult problems had to be solved. His machine was finished and installed in a Cadillac in Detroit early in 1911. This car was destroyed by fire but Kettering had equipped another car with a duplicate starter.

Then Kettering, while experimenting on roads near Dayton, broke his leg when his car slid off the road. The Detroit problem had to proceed in charge of the one other man on Kettering's staff, whom he sent to Detroit. This man got the Cadillac car running, but not satisfactorily. So "Ket," who had been in bed for two days with his broken leg, came to Detroit by train, located and corrected the trouble. The Cadillac Company, after further testing, adopted the electric starter as standard equipment. The electric self-starter was on its way to help make the pleasant and satisfactory driving we have today.

Among Kettering's other well-known achievements is the invention of Ethyl gasoline. It was claimed the electric starter produced vibrations and caused noise in the motor. Kettering disagreed, arguing that fuel caused the racket. Ten years or so of experiment proved him right.

Another one of Ket's major contributions to the present is the development of proper lacquer finish on cars. The bottleneck of mass production was in the paint room. The story will stand a retelling of how Ket arranged a meeting of paint manufacturers and explained to them that taking 33 to 37 days to paint an automobile body was ridiculous and that they must get together as a unit and work out some solution and cut the time.

The group studied the problem and, when they were ready to report, seemed quite pleased with progress. They announced to Ket that they had cut the time to 30 days. Characteristically and definitely, "Boss" Kettering explained they had not appreciated the seriousness of the problem, or what was necessary; that he was thinking not about days involved but of hours. They went back to work and so did Ket.

The story of his search, told by Kettering, is that he picked up some small, low cost, lacquered articles in a New York novelty shop. He knew that painting the novelties could not have been costly; that it must have been a quick process. Upon inquiry, he ascertained that the work had been done in New Jersey. He tried to obtain a quantity of the lacquer but the shop had never made very much of it and its owner carefully explained that it could not be used for finishing an automobile because "it dries too damned fast."

Ket returned to the laboratory and, with the assistance of the duPont Company, began to get results. The story has a nice concluding episode. Some time later Ket asked one of the leading paint men to come to his plant prepared to spend some time with him. When the paint man arrived, Ket showed him a number of sample boards painted in various colors, explaining that he was trying to decide which might be the most acceptable colors to meet public taste and approval. "In other words, which of those colors would you choose for your car?" he asked. The visitor indicated his choice. They talked paint, had lunch, talked more paint.

Finally, the visitor said he must be leaving. Ket went with him out in the yard. His visitor could not find his car. Kettering asked what kind of car it was and was told it was a Cadillac. Ket then pointed to the only Cadillac on the lot and said, "This must be it." The paint man identified it as his car but, of course, could

not believe that it had been refinished during his visit. That demonstration was a clinching argument to the paint men that painting a car could be reduced from 30 days to three hours if the old techniques were discarded and they would proceed on the theory that "nothing is an impossibility"—Ket's life long working maxim.

Boss Kettering's contributions are legion in the way of metallurgy, chemistry, engineering and mechanics. His is a glorious chapter in the development of the motor car industry.

To work with or for him is considered the greatest privilege young chemists, engineers or metallurgists can have. He is rarely called "Mr. Kettering," except at formal meetings or social affairs. Under all other conditions the engineering world and its friends address him and speak of him with affection and respect as *"Boss Ket."*

BODY FINISH BOTTLENECK CUT

In recording the advancement of car engineering and production, the processes and materials having to do with the appearance of the car should not be overlooked. In no field, perhaps, have greater strides been made than in the production of paints and varnishes which are so important to the appearance of the car when new and also in retaining a fine finish throughout its life. As recorded elsewhere, the tedious and time-consuming processes necessary in finishing motor car bodies, even after the experimental processes were completed, were only reasonably durable. Varnishes soon cracked, blistered and discolored. Furthermore, the space required for handling paint jobs covered acres of ground. The urge of the industry for a finish that could be applied, dried and polished within a few hours, and stand up as long as the car lasted, was insistent.

In 1906, Chilton's Guide listed fifteen firms supplying paints and thirty-eight firms supplying varnishes. The

directory for 1946, listed five firms producing varnishes and five firms supplying paints now used in passenger car finishing. Here again, the same type of research and trial and error method were employed before successful results were obtained in a quick-drying varnish and paint. To mention one of the products, "Duco," nitrocellulose lacquer, was developed in 1923, by the duPont Company.

Up to the time the quick-drying finishes made their appearance, one of the main bottlenecks in the production of motor cars was the finishing room. While quick-drying nitrocellulose lacquers had been used for years for special purposes, its solids interfered with its application in automobile body finishing.

In 1920, a duPont chemist observed that adding a small amount of sodium acetate to a thick solution of nitrocellulose, followed by storage, caused the solution to become thin enough for spray application. Then followed more experimentation with many different gums, resins, plasticizers and pigments which were exposed on panels in different weather elements all the way from New Jersey to Florida, for testing. A product was finally developed which dried in minutes while the color varnish previously used took days. Hot sunlight could not crack the film, nor could water injure it. The new lacquer finish was first used on an open car in the autumn of 1923.

There is no question that the labor and time saved in the finishing of motor car bodies assisted in reducing the cost to the consumer, as did similar discoveries and improvements in all other processes and materials used in the manufacture of the motor car. The new product also had other things to recommend it, such as refinishing damaged bodies. Dents could be easily bumped out of steel bodies and quickly refinished.

This new product reaches into the cotton fields for short fibers, too short for spinning. These are used in pro-

ducing the synthetic product known as nitrocellulose or pyroxylin.

The chemical and research laboratories of this industry, as well as all those producers of parts, units and materials used in the making of the motor car, are constantly searching, analyzing and experimenting for better products, costing less and lasting longer.

CHAPTER 28

Balloon Tires Are a Long Cry from Solids of Yesterday

As any new method or material for any one of the fundamental working or functional parts of the motor car was developed or refined, the makers of other parts of the car automatically brushed up their engineering departments and made improvements and refinements of their own. It was, and is still, a continuous race for improvement to meet new engineering demands imposed by changes of old parts, or the adaptation of new parts of the car, or—as in many cases—just the good old Yankee competitive spirit to get out in front.

It would be difficult to imagine a motor car without the modern low-pressure pneumatic tire. There are people around today who remember some of the experimenters' first cars, equipped with solid rubber tires.

As is the case with many other important parts of the motor car, the rapid development and improvement of the pneumatic tire runs parallel with the vehicle as a whole; which is another way of saying that every part of the car was, and still is, going through the same process.

The Chilton Directory for 1906 listed 14 makers of pneumatic tires, 24 makers of solid tires and four makers of leather tires. There were even some rope tires. The leather idea passed out of the picture very quickly, although for a number of years there were leather steel-studded shoes made to fit over the rubber tire.

The Directory for 1946 shows that 24 companies are making pneumatic rubber tires, although many names which were familiar in the '20s have entirely disappeared.

There are six solid tire manufacturers still supplying that demand.

The early attempts at making pneumatic tires for motor cars were, of course, based upon the prevailing knowledge of producing small rubber tires for bicycles. In the first few years, all tires were built with smooth treads. Clincher tires made their appearance about 1891. Road experience soon developed the necessity for a more positive mechanism to secure the tire to the wheel. The straight side beads followed. The cord tire was soon born.

According to old-timer Joseph B. Weston, tire companies first used the word "guarantee" in connection with their product in a most conservative way. The industry adopted the custom of making a price adjustment on replaced tires that had failed from supposed defects on a mileage expectancy of 3500 miles. Most of the tires produced by manufacturers did not last for 3500 miles, so the guarantee was operative on a large percentage of tires made and sold.

Weston's experience, all the way from salesman, sales manager and executive officer in tire manufacturing organizations, as well as his presidency of the Rubber Association of America, gave him a panoramic view of tire development and production up to the modern product which, like all other parts of the motor car, has reached its present high state of perfection through laboratory and revolutionary technique in the use of materials and workmanship.

The early improvement of the product resulted from cooperative effort and contribution of practical engineers, employees of tire manufacturers and laboratories, in conjunction with independent chemical plants and fabric mills. This pool of engineers, chemists and statisticians contributed much to the early attainment of a good product, which was quickly registered by the lessening demand for adjustments on tire products of

all the companies. This combined study brought improvements in tire building which overcame the obstacles of increasing horsepower and weight to be carried at high speed of travel, and the lowering of the wheel heights, which at one time were as high as 40 inches and are now about 15 inches.

Every tire maker was seeking the opportunity to advertise the fact that his tires had been used on this or that car in certain races, touring events, reliability and other runs. One could usually find truckloads of tires following all of these events.

In the early '20s, the balloon tire with its low air pressure of 28 to 35 pounds made its appearance, replacing the previous tire construction which used sixty to ninety pounds of air pressure. Treads were widened and improved, resulting in today's easy-riding motor car. Modern introduction of nylon and rayon, as used in the fabric of the casing, has greatly added to the service of the tire.

One wonders how World War II could have been fought on every type of terrain of three continents without the modern tire as used in all mechanized equipment, including artillery, as well as the extraordinary type of tires which have been developed for large bombers and all types of aircraft.

Other war uses of rubber were: gas masks, rubber-steel armor plate, bullet-proof tires, bullet-proof tanks for airplanes and many other things—the necessity for which greatly concerned the nation, due to the fact that our major supply of raw rubber had been cut off by the Japs. This scarcity sent the scientists into the laboratories where "midnight oil" burned until two or three forms of synthetic rubber were produced. Synthetic rubber is certain to find a permanent place in making various types of tubes and casings, to say nothing of its extended use for other mechanical purposes.

In the case of rubber tire manufacturers, it is again

impossible in a brief resume to single out and individualize achievements, early or modern, of the various well-known companies of today or their personnel, many of whom were, and have been, constant pioneers through the development of the motor car from the vulcanizing discovery of Goodyear to the present day.

THE WORLD SENDS MATERIAL

Great industries have been built up in producing the thousand and one smaller parts, materials and accessories such as are used in the construction and equipment of every one of our modern motor cars. There are lamps of various kinds, tanks, bumpers, heaters, defrosters, horns, pumps and compressors, gauges and meters, clocks, chains, metals of every kind, fabrics and leathers, tools, garage machinery and equipment—much of which was born with the motor car. Mufflers—no longer just a nest of heavy iron cups bolted together—are now an "intricate sound deadening device and carry dangerous gases beyond harm, expertly engineered to the exact requirements of each motor."

William J. Cameron, at one time of the Ford Motor Company, pointed out in one of his radio talks, that the motor industry calls upon the farm for millions of pounds of wool—which demand requires millions of sheep to produce; the glues made from hides, milk, grease, glycerine, soap chips, millions of square feet of leather, bristles from the hog, millions of pounds of goat hair for mohair upholstery, bee's wax, millions of pounds of cotton as used in tires, batting, cloth, brake linings, timing gears and safety glass. The cornfields produce billions of bushels of corn for butyl alcohol and starch used in manufacturing, millions of pounds of flax for linseed oil, sugar cane for production of solvents, anti-freeze and shock absorber fluid and castor beans for the castor oil used in lacquers and artificial leather.

Then there are jute, hemp, sisal and Manila fiber for carpet backing and ropes, millions of feet of lumber required for paper board, pitch pine for turpentine and solvents, to say nothing of the enormous number of rubber trees required to produce natural rubber for tires and other purposes. Millions of pounds of cork are also required and millions of gallons of tung oil.

The fields of metals and plastics to which the motor car industry turns for its regular supplies, and substitutes, is almost limitless.

* * *

I THINK IF ONE asked the average owner, or driver, to name the items used in motor car construction he considered the greatest aid, and most conducive to satisfactory driving, it is an odds-on bet that he would name the self-starter, balloon tires, windshield wiper and safety glass. One wonders how many motor cars would have been made, sold and in use today if the old arm-breaking, hand-starting crank had not been replaced by the electric self-starter. Certainly there would be fewer women drivers.

The buyers of all cars up to 1912 can recall without difficulty standing out in the rain or snow, or on cold mornings, going through the motions of trying to crank a cold motor. It was a back-breaking, dangerous operation.

So, for the motor car part which gives the greatest satisfaction to the driver, I nominate the electric self-starter and make a broad, sweeping bow to Boss Kettering.

Whether or not one realizes it, much of the comfort of riding in the automobile of today is due to the balloon tire, which made its appearance as standard equipment about 1922.

No matter how much ease and comfort a driver may experience, it must be accompanied by a feeling of safety. Under this heading, I would clearly place the windshield

wiper and safety glass as the two greatest safety inventions. Both are tremendously important, but I do not believe that the little windshield wiper has yet been nominated to the Hall of Fame.

There are many other parts of the motor car which are highly essential to satisfactory and safe driving. As a matter of fact, in such a complex combination of materials and parts combining the principles of power, electric and water systems, engineered to withstand high speeds, heavy weight, bad roads and bad driving, there are many parts contributing to satisfaction and safety in use, but in my book, the four items mentioned come right at the top of the list.

Of course, this all presupposes a good braking system. Brakes, however, do not fall into the category of modern invention as do the items above mentioned.

Every motorist, in the early days, carried two or three cloths and had to get out in bad weather to wipe off his windshield. Then came the hand-operated device which was used when the windshield was made in two parts, with the upper half adjusted to swing out for ventilation.

About 1920, the swinging type of hand-operated windshield wiper, with a spring-pressed arm, made its appearance. All the early wipers were operated by suction. Most modern cars are equipped with electrically-operated wipers. That little device is certainly a necessary accessory for safe driving in the temperate zone, with its many changes of weather.

THE GOLDEN STREAM OF SERVICE

One of the golden streams flowing from the motor car industry and one that plays a tremendously important part in our economy is the servicing and supplying of parts to America's 25,000,000 or more automotive vehicles.

The National Standard Parts Association has sup-

plied some interesting and impressive information which has been released by its War Industry Committee. It states that there are 98,269 public repair garages, private fleet repair shops and vehicle repair shops, maintaining automotive transportation and that 5,451 wholesale or distributing concerns are required to carry the necessary replacement parts to do the job. These distributors are, in turn, supplied by 963 manufacturing concerns.

One begins to get some idea of the extent of this business when one learns that, exclusive of gas, oil and tires, the automobile repair bill for parts and services, amounts to $1,750,000,000 yearly. Of this amount 71 per cent, or $1,250,000,000, is supplied by the 963 parts manufacturers through the 5,451 parts distributors.

Stocking and carrying of some 30,000 different repair items, in all parts of the United States, Canada and foreign countries handling American cars, is a tremendous job which takes a vast amount of organization and capital. Some of these items must be carried in as many as 25 or 30 different sizes and must be stocked in quantity, in accordance with service mortality tables compiled out of the experience of years.

When visualizing 963 large manufacturing concerns, each a specialist in a specific field and each equipped with the most modern machinery devoting all its facilities and skill to the production of a certain part, then one begins to get a more complete understanding of the ramifications of the motor industry. These 5,451 wholesale material distributors are located in 2,171 key trading centers.

Our American economy, according to the study of the National Standard Parts Association Committee, is greatly dependent upon the motor vehicle. In the United States alone, 54,000 communities depend entirely upon automotive transportation. In the movement of freight, manufactured and agricultural products, Michigan provides a typical illustration of the usefulness of the commercial

vehicle. Sixty-seven per cent of the freight in and out of the Detroit industrial area comes in on rubber tires rather than by rail, boat or air.

Seventy-five per cent of Michigan's factory workers travel to and from their work in private cars. Forty-two per cent of Michigan's communities depend entirely on motor vehicles.

Because of these statistics, the point is made by the National Standard Parts Association that the 5,451 parts distributors are really the backbone of automotive service. The 963 manufacturers thus find their products flowing through this distributing organization to the 98,269 repair shops which function as doctor and hospital when cars are "ailing."

CHAPTER 29

Another Peek Over Horizon May Bring More Surprises

In the development of any new science, especially where an industrial process or product is concerned, there comes a time when pause is indicated so the producers and processors may take inventory of what has been accomplished toward perfection in method, design and fuller use of their complete product. Automobile manufacture has reached this stage.

The industry has indulged itself in few "inventory" pauses. Its work has been a race—a headlong dash into the unknown and untried. It registered no degree of static between its small and feeble beginnings until during the '20s when gains in laboratory methods and on proving grounds began to take solid form.

The pause in 1946 was indicated through necessity for reconversion but it would have come anyway because motor makers knew it was time to stop and look ahead, to recast plans for the future. They knew that the cars they had manufactured in the very early days were anything but perfect but they were always making long-range plans for improvements. With the ending of the war, the making of such plans has taken on a new tempo.

So now the pause—the ever-so-slight pause—while the industry's best brains go into high-gear thinking, realizing that startling changes must be made in automobile design because improved techniques, better metals and war-born production practices have made possible the "Car of Tomorrow." The Ketterings, Zeders and a lot

of others who just didn't know it couldn't be done, showed the way.

I believe William B. Stout knows as much about the "Car of Tomorrow" as anybody else. And he is well qualified to talk about it. His name will go down in automotive history with many others who have done the industry's forward thinking. Stout is also an expert on airplanes and prefabricated houses.

Let "Bill" Stout tell about the Car of Tomorrow.

"The automobile has never been what it should have been but is, instead, a rather skilful compromise. In 1900, or before, a French concern built a motor car with its engine in front under a hood. The practice has been generally followed ever since. That was a mistake.

"The automobile, properly designed, should have its motor in the rear. Such design will improve steering, traction and braking, and permit body design possessed of more space and greater comfort for the passengers."

Stout gives his reasons for placing an engine in the rear:

"If the front of the car were lighter, steering would be improved. In steering a front-engine car, the driver feels the weight of the engine and has to turn its weight right or left each time he alters direction.

"Traction would be much better with the engine in the rear, especially in mud, snow or gravel. With the present heavy front end, the car's front wheels bury themselves in soft surfaces while the rear wheels spin."

Stout gives more reasons for a rear-end engine. Better braking, for one. "Also," he says, "a rear-end engine would be safer, though the average driver thinks an engine in front offers safety." Stout points out that a front engine in a heavy crash is apt to "jump into the passengers' laps."

We quote Stout again:

"It is in the interior design that the rear-engine car provides the greatest advantage. Need for a long drive—

shaft running from engine to rear wheels is eliminated, and so the floor can be lowered, increasing headroom in the car without adding to the height of the vehicle. Furthermore, with no engine in front a moderate-sized hood can be provided to protect luggage and spare tires. Such a front compartment can be designed to give the driver much better visibility.

"Another fault of present-day cars is over-weight by reason of their heavy engines. Bodies are made of steel and the chassis is a heavy structure in itself."

Stout says it is possible to build a car weighing less than a ton. His experimental car—the "Forty-Six"—has no chassis. He says its body, with floor, sides, ends and roof in one piece, provides all the needed strength.

He sees a further reduction of weight by use of lighter metals. Wheels can be made of magnesium and more aluminum can be used in the body construction.

Engine development, Stout predicts, will require reconsideration of the entire concept of the automobile. "Take a six-cylinder horizontal opposed engine, one that lies flat, weighs less than 300 pounds and takes little room, and put it in an automobile. The necessity for a long hood disappears. The possibility of redesigning the body for passenger comfort forces itself upon the attention of the designers.

"It is because of this highly important development in power plants that we are to see more changes in car design in the next ten years than we have since World War One.

"Lighter cars will bring other benefits," he says, "including better roads and more long-distance travel." He sees new expressways and high-speed rural highways with automobiles roomy enough to provide a bed in rear for one driver to sleep while another drives.

These changes will come slowly, he believes. New materials needed are too costly now and production

problems must be ironed out. "But they will come," he says.

"To dream far beyond the present day," Stout states, "there'll come a time when the automobile and the airplane will blend into one vehicle. By adding wings to his car, the driver will have an airplane. Many engineers believe that the difficulties of combining car and airplane are too difficult to be overcome. The difficulties are there —and they are real. But to say that they will not be overcome is to discount the ingenuity of our air-minded youth . . ."

Last year the Grand Rapids Chamber of Commerce honored William B. Stout with a dinner to commemorate the Twentieth Anniversary of air passenger service between Detroit and Grand Rapids. This service was started by the Stout Airways, Inc., and the airplanes used, made by Ford Motor Company, were "Bill" Stout's tri-motored planes, the first all-metal jobs ever placed in commercial use.

CONCLUSION

The Automotive Industry, directly and indirectly, has produced a type of leadership in men that has no exact prototype in industrial history.

It is said that men are the product of their times, so we might take a look at the two decades beginning in 1910 and ending in 1930.

The so-called "machine age," which really began at the time of the McKinley administration, paved the way for the machine demands of World War I, putting us well on the way to mass production.

Those periods in our economy, wherein a fairly normal balance exists, are the result of conditions which permit men and machines to roll production off the line in great volume with an ever-increasing standard of improvement in product and reduction in sales price.

Under such conditions, imagination is stirred, ambitions heightened and the desire to improve, advance and achieve becomes the motivating incentive of workers and management alike.

Most of the top men of the automobile industry and their staffs, were reared in a period of free enterprise which permitted unlimited rein to initiative and resourcefulness.

Are the conditions which exist at the moment conducive to raising other crops of leaders such as developed the motor car and its allied industries? The spirit of adventure and daring, backed by individual faith and courage, are the ingredients responsible for the amazing accomplishments of this great industry in a few decades.

Does the political and economic situation, at this time, invite venture and daring in expanding and further developing our resources?

The spirit of self-reliance of our forefathers was not concerned with the "cradle to the grave" security theory, which is tending to destroy the responsibility of the individual for having more than a causal interest in his future welfare.

It is true that our social conscience had not awakened in those early days. Instead of adopting a process of evolution, we have permitted the whole problem of labor and management to approach revolutionary form. We now find that politicians, in an attempt to establish social reforms, are forcing our economy into a mixture that bids fair to break down the very foundation of the free enterprise system which has produced the men, the machines and the methods which made ours the outstanding country in the world.

Science and research, wonderfully stimulated by the necessities of war, will continue to develop amazingly in the post-war period. Every effort, political and otherwise, should be dedicated to recovering the spirit which animated our industrial pioneers, and every law-restricting barrier should be removed to permit our economy to receive full benefit of the findings of the laboratory. Otherwise, it is just possible that we might find the discoveries of science and research running ahead, with production unable to follow because of political restrictions, thus reversing the process of the earlier periods wherein production techniques led the way, while laboratory research was still in its infancy.

When management and labor find a solution to their problems and are free from the idea that politics and social theories hold the answer, then—with a dedication to unselfish principles—our free enterprise system (if we still have one) will continue to produce the type of virile

men who have harnessed and utilized the resources which have made this country the envy of the world.

Courage has been dampened, but we still have faith in ourselves. We cannot further continue to lose the ingredients that made the men who have produced the great industrial era, just climaxed by the unbelievable and miraculous production of materials and supplies that equipped practically all the nations of the world to wage a successful war against a barbarous and tyrannical but well-equipped foe.

The 1947 model of America is totally different from the America before the advent of the motor car. Not that the motor car was entirely responsible for the complete change of tempo and the social behavior of our people, but it would be difficult to find any other one implement or device in common use that has contributed as much to this change.

Every year, since the motor industry began its headlong pace into volume production, screams with modernity, and has lighted the way into a world that has challenged the imagination of every individual, from the designer and maker of a car to every individual who owns one and every individual who expects sometime to own and drive his own car. The motor car has broadened the horizon of thinking and of life and left its impact upon practically everyone. It has been the means of opening opportunities unlimited, directly and indirectly, into practically every sphere of usefulness.

There is no question but that the techniques used in the production of the motor car and its parts have touched and influenced the production methods in thousands of different lines. The motor car tempo is fast. It has shaped the destinies of many and, if you please, brought a new means of self-expression in this hurried civilization.

The motor industry will continue to lead—displacing the old to make way for the new—in the rebuilding of

post-war America. Many men were brought into the motor car industry who never before had the opportunity to demonstrate their capacity; nor did they realize the heights to which they could go until the opportunity presented itself in this miracle industry. These men have registered new "highs" in the science of production.

The saga of the motor car, with its never ending challenge for things new and better and presenting endless opportunities for even greater accomplishments, continues to roll along, taking us all with it, whether we will or not.

MILE POSTS

Here Are Some Mile Posts Along the Road of Progress

Mass production and efficient methods of manufacture in many industries have been copied from practices inaugurated by the builders of automobiles and component parts.

Here are some of the mileposts that genius and forward-looking minds of the Motor Industry planted on the highway in the rapid march to engineering and mechanical achievements, which have left their indelible mark on this and other industries:

1904 Hartford shock absorber was announced by E. V. Hartford.
Prest-O-Lite gas introduced for headlights.
Demountable rims appear.

1905 Tire chains, tubular horn, universal rims, ignition locks, are introduced.
Side door entrances to the tonneau for body of the car, replace rear entrance tonneau models.
Reo placed a screen over the intake, which was probably the first air cleaner.

1906 Ford produced a 6-cylinder car.
Some cars use bumpers for first time.
Adams-Farwell car features 5-cylinder rotary motor.

1908 Speedometers appear, generally, as well as sleeve-valve engines; silent timing gear chains; motor-driven horns; helical gears.

1909 Ford introduces the first left-hand drive car.
Cars appear with "one-man" tops.

First over-drive transmission introduced on Gramm trucks.

1910 American-LaFrance produces first motor-driven fire engine.

Haynes is first company to equip an open car model with top, windshield, head lamps and speedometer, as standard equipment. Heretofore, these accessories had been considered as extras. A good speedometer then cost as much as $125.

Cadillac company placed first big order for 150 closed bodies with the Fisher Body Company.

Peerless made the engine-driven tire pump standard equipment.

Dr. A. H. White, of New Hampshire, is said to be the first man to induce automobile manufacturers to put an ampmeter on the dashboard.

1911 Buick produces its first closed car.

U. S. Court of Appeals declares Selden Patent invalid.

Cadillac has electric starter.

Hudson features multiple disc clutch.

1912 All-steel bodies begin to appear.

1913 Wire wheels appear on several cars.

Bendix drive introduced.

Packard uses forced feed lubrication.

1914 Pierce-Arrow puts headlights in fenders.

1915 Cadillac has tilt-beam headlights.

Packard builds America's first 12-cylinder car.

1916 Oakland brings out V-8 motor.

Fordson Tractor announced; Henry Ford buys River Rouge factory site.

1917 New Paige coupe has V-type windshield.

First auto wrecking crane makes bow.

Columbia features first automatic radiator shutter.

1921 First "Straight 8" engine offered in a production model, is built by Dusenberg.

Radiators and lamps have nickel-plated finish.
Cadillac has thermostatic carburetion control.
New fangled hydraulic brakes appear.
1922 Balloon tires become standard equipment.
1923 Four-wheel brakes are introduced.
Oakland first to use Duco instead of paint or varnish.
1924 Ethyl Gasoline is put on the market.
1925 Oldsmobile introduces chrome plating.
1926 Chrysler has rubber engine mounting, rubber spring shackles.
Packard has hypoid gears.
1927 Ford switches from Model T to Model A.
Lockheed introduces internal hydraulic brake system.
1928 Safety glass (shatter-proof) introduced by Ford in all windshields as standard equipment.
Synchro-mesh transmission first used by Cadillac.
1929 First Auto radios appear.
1930 Studebaker introduces "free wheeling" to motordom.
Studebaker also uses helical gears in their transmission.
1931 Plymouth has "floating power."
Many cars adopt "free wheeling."
1932 Ford V-8 supplants Model A.
First Diesel engine car is presented to public.
Graham introduces full-skirted fenders.
1933 Fisher Body introduces "No draft ventilation."
1934 DeSoto introduces automatic transmission overdrive and Airflow design.
Supercharger built by Graham.
Reo gearshift installed on dash.
1935 Hudson introduces "electric hand."
1936 Ford granted patent on brake for rear-engine drive, streamlined car.

1937 Oldsmobile introduces automatic transmission.
1938 Packard introduces Econo-drive.
Pontiac adopts Duflex rear springs.
Buick features new Dynaflash engine and coil spring rear suspension.
Chrysler develops Superfinish and introduces "fluid drive."
1940 Automatic gearshifts are introduced.
Chrysler introduces safety rim wheel.
1941 – 1942 – 1943 – 1944 Plants converted to war production.
1946 Plants reconvert to peacetime economy.

MOTOR CAR PRODUCTION DATA

In automotive history, it is not necessary to go back of the year 1900, as any cars made prior to that time were clearly a miscellaneous makeshift collection of buggy and other parts, merely to demonstrate that a vehicle could be built to run on motive power other than horse power. This was also true of the few years subsequent to 1900. Nevertheless, a distinct approach and specific application of mechanical and engineering ideas were on the way to a solution that ultimately was to result in building a foundation upon which a great industry was created.

The following table shows the number of automotive vehicles produced in the years beginning with 1900 through 1942:

Year	*Number of Passenger Cars*	*Number of Trucks*
1900	4,192	
1901	7,000 to 9,000	
1902	9,000	
1903	11,235	
1904	22,419	411
1905	24,419	450

Year	*Number of Passenger Cars*	*Number of Trucks*
1906	33,500	500
1907	43,300	700
1908	63,500	1,500
1909	127,731	3,253
1910	181,000	6,000
1911	199,319	10,681
1912	356,000	22,000
1913	461,500	23,500
1914	543,679	25,375
1915	895,930	74,000
1916	1,525,578	92,130
1917	1,745,792	128,157
1918	943,436	227,250
1919	1,657,652	275,943
1920	1,905,560	321,789
1921	1,468,067	148,052
1922	2,274,185	269,991
1923	3,624,717	409,295
1924	3,185,881	416,659
1925	3,735,171	530,659
1926	3,783,987	316,947
1927	2,936,533	464,793
1928	3,815,417	543,342
1929	4,587,400	771,020
1930	2,784,745	571,241
1931	1,973,090	416,648
1932	1,135,491	235,187
1933	1,573,512	346,545
1934	2,177,919	575,192
1935	3,252,244	694,690
1936	3,669,528	784,587
1937	3,915,889	893.085
1938	2,000,985	488,100
1939	2,866,796	710,496

Year	*Number of Passenger Cars*	*Number of Trucks*
1940	3,692,328	777,026
1941	3,744,300	1,094,361
1942	220,814	(Figures not available)
1946	2,140,000	930,000

It will be noted that reading the above figures is somewhat like reading a thermometer. One can quickly spot the gyrations of our economy as reflected by the increases and decreases in production, indicating the inability of the public to buy cars in the lean years and its immediate response to buy and own modern transportation at the first opportunity.

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